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General:

Editorials:

The Reader's Page:

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Interesting new Milwaukee diner is equipped with Timken Bearings

Perpetuating the name of Dan Healey, famed Milwaukee Road steward of days gone by, this new diner is also representative of a new standard of dining car luxury and comfort.

It is mounted on Timken Bearings to give the smooth, joltless riding ease and hot-box-free dependability associated with Timkens in so many other famous units on the Milwaukee Road. Two cars of this type were recently placed in service.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

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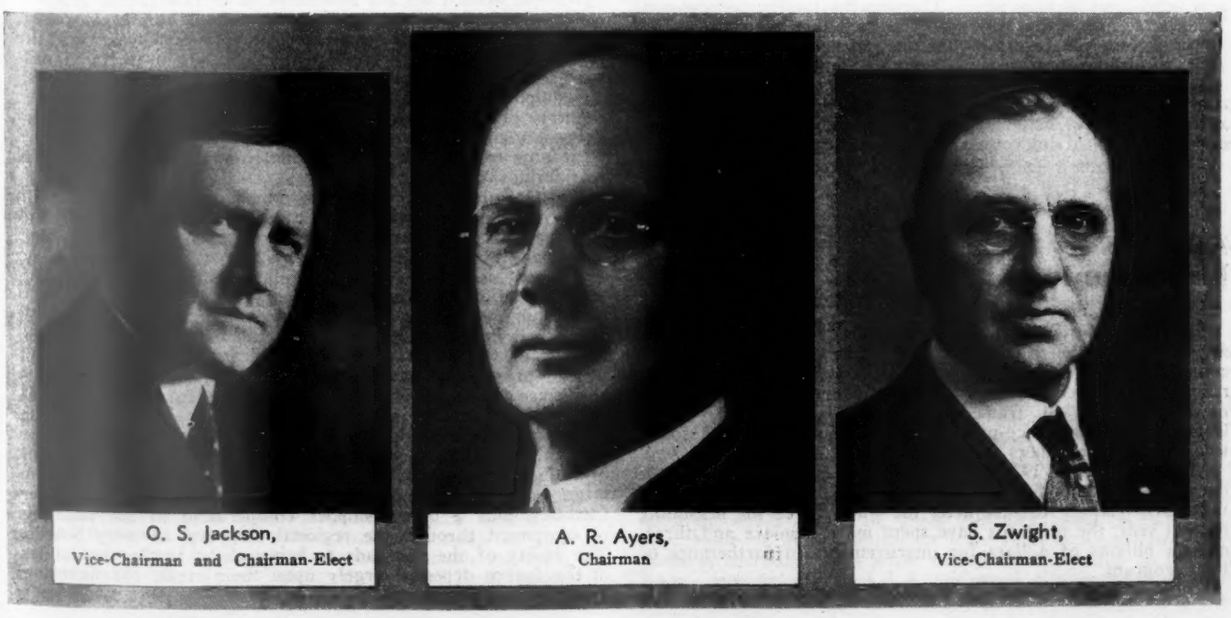
Twelfth Meeting of Mechanical Division Held at Chicago

Mechanical Division, A. R. A., holds two-day session beginning June 23—Principal addresses by R. H. Aishton, and M. J. Gormley — Total of 18 committee reports and one paper included in program — O. S. Jackson elected chairman

THE Mechanical Division, American Railway Association, held its twelfth annual meeting at the Congress Hotel, Chicago, June 23 and 24, 1931. In accordance with the program announced several months ago, all entertainment and exhibition features were eliminated and the meeting was confined strictly to a two-day business session. Following the opening exercises, Chairman A. R. Ayers, general manager, New York, Chicago & St. Louis, made a brief address and called for the report of the General Committee, which was read by Secretary V. R. Hawthorne. This report outlined the principal activities of the Mechanical Division during the past year and, among other items of special interest, stressed the important test work conducted under the auspices of the division, as follows: Road tests of power brakes, a report of which is now under preparation; coupler tests, as a result of which a swivel-butt coupler and yoke design are suggested for adoption as alternate standard with the Type-E coupler; draft gear tests, resulting in the recommendation that the specifications for approved draft gears submitted last year be adopted as standard except as regards the recoil feature which is subject to further



O. S. Jackson,
Vice-Chairman and Chairman-Elect

A. R. Ayers,
Chairman

S. Zwight,
Vice-Chairman-Elect

study; laboratory tests of automatic hose connectors made at Purdue university under the direction of H. A. Johnson, director of research, American Railway Association.

Chairman Ayers introduced the first speaker at the opening session, R. H. Aishton, president of the American Railway Association, who was followed by M. J. Gormley, executive vice-president. Abstracts of the addresses and committee reports presented during the two-day session of the division are included below, with the exception of a brief report of the Committee on Utilization of Locomotives and Conservation of Fuel. This consisted of a summary comparison of operating statistics of 1929 and 1930.

Mr. Aishton's Address

After welcoming the members to the convention, R. H. Aishton, president of the American Railway Association, stated that, individually and collectively, they are now faced with difficult problems, but almost every other industry and class of men is now confronted with similar problems which are no more serious than have been met and overcome in the past. The keynote of Mr. Aishton's brief remarks was an appeal for railroad men to be receptive to new ideas and willing to violate all precedents, if necessary, in helping fit the railroads to meet new conditions successfully.

Mr. Aishton quoted at length from newspaper clippings which openly charged American railways with negligence in failing to develop light-weight equipment with operating speeds up to 150 m.p.h. as are reported obtainable with the Zeppelin air-propelled rail car recently developed in Germany. These clippings maintain that if American railroad engineers have not sufficient initiative to carry developments of this kind to a successful conclusion, they ought to call in European engineers to show them how. Mr. Aishton said that, while he does not necessarily advocate the type of equipment referred to, and practical railroad men in this country consider operating speeds of 150 m.p.h. "the stuff that dreams are made of," he does advocate that railroad men keep their eyes open to new developments which are going on everywhere about them. Past experience has shown that practically every vital improvement in railroad practice and operation in the past has been looked upon with skepticism and distrust at first.

Mr. Aishton paid a high tribute to the work of the Mechanical Division, as well as to the mechanical departments of the railroads in general, and said that they must bear the brunt of developments of those devices and methods which will enable the railroads to keep in the forefront of progress and meet new conditions as they arise. Quoting the familiar expression, "The horse makes the wagon go," he said that adequate motive power is essential in order that the railroads may continue to carry the transportation burden of the country.

Mr. Aishton closed his remarks with the statement that the board of directors of the American Railway Association is keenly desirous of helping the Mechanical Division in its vitally-important task of improving mechanical-department conditions.

Address by Mr. Gormley

The railroads, due to greatly-increased efficiency in operation, can continue to meet, without difficulty, for some time to come, but with fewer freight cars than they now own, the transportation requirements of this country based on any reasonable peak of traffic that might be expected, M. J. Gormley, executive vice-president, American Railway Association, told the members of the Mechanical Division.

"The railroads in 1923," said Mr. Gormley, in addressing the opening session, "adopted a program for the rehabilitation of the transportation machine after the war. Since the beginning of that year, the railroads have spent more than six and three-quarter billions of dollars for improvements in furtherance of that program.

"Since 1923, the railways have placed in service approximately 890,000 new cars and 15,000 new locomotives, but have retired so many that we now own 116,000 fewer cars, not including refrigerators, than at the high point of ownership in 1925, and have 9,000 fewer locomotives. This new and improved equipment, with more powerful locomotives and increased capacity of cars, has brought about an increase in efficiency in movement of cars in the past eight years of 26 per cent, based on the miles per car per day, not including surplus equipment. There has also been an increase of 26.6 per cent in the miles per train-hour during the same period.

"As a result of this efficiency and economy, the unit cost of railway operation has been decreasing annually. If the unit cost of operation had been the same in 1929 as it was in 1923, the total operating expenses of the carriers would have been greater than they were by $519,000,000. This would have meant a reduction of 41.5 per cent in the net income actually earned in 1929.

"We do not, however, get the full advantage of this increase in efficiency in movement unless it is paralleled with a reduction in the amount of capital invested in equipment.

"In view of the greatly-increased efficiency of movement, and based on any reasonable peak of traffic that might be expected, we now estimate that the traffic of the country for some time to come can be handled with a further decrease in freight cars, not including refrigerators, of 134,000, which would mean a total reduction of 250,000 under the ownership at its high point in 1925. This is a conservative estimate, and is not based on the depressed situation of today or of last year.

"In bringing about any reduction in car ownership, it should always be kept in mind that it can be accomplished successfully only by continuing the policy of replacement of the less efficient cars by a lesser number of modern cars and by a standard of maintenance that will reduce delays to loaded cars en route."

In discussing standards of maintenance, Mr. Gormley mentioned the considerable number of cars now going to repair tracks because of defective brake rigging, trucks, draft gears, arch bars, etc., and suggested that these parts receive proper attention wherever cars are on the repair tracks for periodic air-brake attention or heavy repairs. General maintenance conditions will thereby be greatly improved and delays to cars and lading correspondingly reduced.

After outlining present conditions with regard to the ownership of automobile equipment, Mr. Gormley said that future purchases of this equipment should generally be made by railroads directly serving the automobile-producing territory, a practice which will greatly decrease the total number of automobile cars required. This same condition applies with respect to other special equipment, such as cars for handling automobile bodies, automobile engines, gondola cars for handling long steel shapes, pipes, etc.

Sufficient Special-Type Cars to Move Traffic

With regard to privately-owned freight cars, Mr. Gormley said: "There are a great many privately-owned freight cars in service today, due to the failure of the railroads in years gone by, for financial reasons or otherwise, to furnish all equipment needed for the movement of certain special types of traffic. With the exception of the brine-tank refrigerator cars, tank cars and a small number of other special-type cars, the railroads are today, through their ownership or through railroad-controlled private refrigerator lines, in position to furnish all equipment needed for the movement of the traffic of the country. There certainly can be no justification today for the extension of the ownership of private freight cars beyond what now exists. This is particularly applicable to stock and refrigerator cars."

Mr. Gormley commended the Mechanical Division for its work in connection with the standardization of materials and equipment in past years, more progress along this line having been made by the railroads than by almost any other industry. He closed his address with the following comments regarding standardization and railway efficiency.

"Nothing, of course, should be done that will interfere with individual initiative, and likewise the work should not be carried to the point where it could be called strangulation instead of standardization. But, on the other hand, the railroads are under the definite obligation to furnish transportation service in the most economical manner possible. The public generally should always keep in mind that the major part of the increase in efficiency since 1923 in the movement of traffic and economy in operation is the direct result of the large expenditures for improved cars, locomotives and other facilities, plus a better shipper co-operation in the handling of equipment through the regional shippers' advisory boards. The ability of the railroads to bring about further economies in the future depends largely upon their credit for financing continued improvements."

Address of Chairman Ayers

During the past year several important matters which will come before you in the committee reports have been worked out in cooperation with manufacturers, shippers, private-car owners, equipment builders, other divisions of the American Railway Association and federal authorities. This cooperation is an important factor in the work of the division and is highly appreciated by us. Some of these groups have been active over a period of years and it would have been difficult, if not impossible, to make as much progress as we have without their assistance.

Progress is being made in the development of special materials and the treatment of materials to meet special requirements of service. The railroads should give fullest consideration to these developments where they will prolong the life of the equipment between shoppings and reduce cost of maintenance. Therein, I think, lies one of our greatest opportunities for improvement.

The outstanding problem which confronts us today is, of course, to meet the prevailing condition of business. At no time within my recollection has the work of this division and other railroad-mechanical organizations stood out to better advantage than it does today, assisting the railroads not only to improve the speed and reliability of service, but at the same time to spend a continually diminishing proportion of gross revenue for maintaining and operating cars and locomotives. I desire to give full credit to those who have been helpful in assisting to carry on this work. The necessity as well as the opportunity for further improvement is growing rapidly larger rather than smaller and we must make even more progress in the future than we have in the past.

Report on Safety Appliances

The investigation of power brakes and appliances for operating power brake systems being conducted by the American Railway Association under order No. 13528 of the Interstate Commerce Commission has been continued during the past year. The road tests, which were under way at the time of the 1930 convention, have been completed and the records of the tests are being compiled, analyzed, and a report prepared. Reference is here made to the reports of the director of research at the annual meetings of the Mechanical division for the years 1925 to 1930 inclusive which present the progress up to June, 1930.

To review briefly, the road tests were started on August 1, 1929, with tests on the standard K brake equipment. This series of tests was completed January 3, 1930. The Westinghouse FC-5 equipment, which was designed to meet the tentative specifications of the Interstate Commerce Commission, was then installed on the test train, and each car was given a rigid inspection, draft gears and couplers dropped, broken parts replaced and renewals made to place the cars in the same condition as they were at the start of the Type-K tests. This work of making repairs and equipping the first 50 cars with Westinghouse Type FC-5 equipment was completed and tests were started on this equipment January 20, 1930. All tests with this equipment were completed June 4th, 1930.

In changing over from the Westinghouse Type FC-5 equipment to the type FC-3 equipment, all cars were given another thorough inspection, draft gears and couplers dropped, broken parts replaced, so that the cars were placed in the same condition as at the start of the standard K and type FC-5 equipment tests. This work was completed on 50 cars by June 10, 1930, and tests were started on the Type FC-3 equipment on that date. This equipment was submitted to the same schedule of tests as the other two equipments, which included level road tests, long moderate grade tests and heavy grade tests. This equipment was built in this form in order to fit the test rack at Purdue University and to facilitate changing over from the FC-5 equipment to the FC-3 equipment. The tests with this equipment were completed November 3, 1930.

As the results of the tests with the standard K, FC-5 and FC-3 equipments had not been entirely satisfactory, a series of research tests was made during the period from November 3, 1930, to January 17, 1931, to determine the features and requirements of a power brake equipment which would be satisfactory for long train operation. Special apparatus was installed on the test train which made it possible to vary and control the speed of brake application through the train and to vary and delay, if so desired, the type of brake application in various parts of the train. After these requirements and features of a satisfactory brake equipment had been determined, the Westinghouse Air Brake Company submitted the FC-3A equipment, a modification of the FC-3 equipment and embodying these features, to determine if a pneumatic brake equipment could be built which would meet these requirements. Tests on the FC-3A equipment were started on January 23, 1931, and completed March 31, 1931.

The tests on the FC-3A equipment completed the road tests, and the work of dismantling the test train was started April 1 and completed April 21, 1931. The Westinghouse FC-3A equipment was removed from all the cars and locomotives, the standard air brake equipment replaced on the cars and the cars were put in proper condition to return to their owners. All test apparatus and equipment belonging to the American Railway Association was shipped to Purdue University, Lafayette, Ind. for storage.

During the progress of the road test a group of men, located at Purdue University, have been compiling the data from the records of the road tests. The group of men working on the test train on the Pacific Coast, have returned to Purdue University and the two groups are now analyzing the records and preparing a report of the road tests.

James Triple Valves Tested

During the past year the James triple valves were tested on the 100-car test rack located at Purdue University and a report has been prepared covering the results of these tests. Twenty-five James valves were installed on the test rack with seventy-five standard K triple valves. All tests with the James equipments were 100-car tests and the James equipments were either the first 25 or the last 25 cars on the test rack.

The tests on the James valves were started February 10 and completed February 18, 1931. The schedule of tests consisted of 23 tests including service applications, emergency applications, releases after both service and emergency applications, cycling and graduated release tests. The rack tests on this equipment developed the following undesirable features:

There were failures of the James valves to apply with both the 10-lb. and 25-lb. service reductions. The James valves which did apply developed 21 per cent less brake force with a 10-lb. service reduction and 3.7 per cent less brake force with a 25-lb. service reduction than the standard K equipment.s

Forty-two per cent of the James valves failed to release following a 10-lb. service reduction when the James valves were on the rear end compared to no failures to release with the standard K equipments. To release these James valves it was necessary to bleed the auxiliary reservoirs.

The substitution of 25 James valves for 25 standard K equipments on the head end of the 100-car test rack delayed the service application of Car 100, 50.8 per cent. The times of application of the other equipments on the test rack were delayed proportionately.

The time of Car 100 to apply in emergency application was lengthened 26.7 per cent when 25 James valves were substituted for 25 standard K equipments. Experience gained from the road tests on the Pacific Coast has shown that lengthening the propagation time increases the severity of slack action and shocks.

There were 8 cases of undesired emergency applications during the running of the 23 tests on the James triple valves.

With regard to grade operation, the brake cylinder pressure developed by the James valve during a cycling operation cannot be controlled when the 25 James valves are located on the rear end of the 100 car test rack. The graduated release feature of the James valves consisted of holding the brakes applied until the brakes were partially recharged and then releasing at the same rate as in direct release position. During the graduated release tests on the test rack, 4.9 per cent of the James valves failed to apply and 17.1 per cent of these valves failed to release.

In view of the results of the tests on the James triple valve, it is recommended that this equipment be given no further consideration in this investigation.

The report was signed by H. D. Johnson, director of research, American Railway Association.

Discussion.—In connection with the report on the power brake tests, C. E. Chambers, chairman of the Committee on Safety Appliances made the following statement:

"All of the air brake equipments used in the road tests (except the standard Type K) were made up in experimental form so that various functions could be used or eliminated or different combinations of these functions could be easily set up. None of these equipments were reduced to a commercial form as no one knows what functions will finally be decided upon. Just before the A.R.A. undertook this investigation, the Interstate Commerce Commission issued its 'tentative specifica-

tions and requirements for power brakes and appliances for operating power brake systems,' which set forth the functions of a power brake, which, in the opinion of the Commission, were necessary. After the results of the road tests have been thoroughly analyzed and the report completed, it will probably be necessary for representatives of the A.R.A. and the Commission to meet together to decide upon the functions of the brake which will be agreeable to both parties. If it is finally decided that the present standard brake must be changed, and an agreement on the new functions of the brake has been reached, then any air-brake manufacturer will be at liberty to develop in commercial form the necessary devices."

Report on Locomotive Design and Construction

Counterbalancing of Locomotives.—At the A.R.A. convention at Atlantic City last June your committee submitted a method for the consideration of the association. Since then a number of locomotives have been counterbalanced by this method, the riding qualities of which are of a superior nature. Your committee now recommends this method of counterbalancing locomotives for adoption as recommended practice.

(Signed) S. S. Riegel, Sub-Committee.

Pressures for Mounting Driving, Trailing and Engine-Truck Axles and Crank Pins.—It is *recommended* that for mounting driving and trailing axles and crank pins into cast-iron centers, the desired pressure be based on 10 tons per inch of diameter with an allowable variation of 10 per cent over or under; for mounting driving and trailing axles and crank pins into cast-steel centers the desired pressure be based on 15 tons per inch of diameter with an allowable variation of 10 per cent over or under.

In mounting engine-truck axles it is recommended that present A.R.A. standard practice for mounting car and tender axles be followed.

In mounting it is recommended that a mixture of 12½ lb. of white lead to one gallon of boiled linseed oil be used as a lubricant. This should be mixed in quantity only sufficient for one or two days' operation, due to the drying quality of the boiled linseed oil. It should be stirred before applying. Do not use raw linseed oil or lubricating oils either alone or for thinning, as they do not dry and tend to work out in service, thus giving a false indication of loose axles or pins.

(Signed) J. C. Hassett, Sub-Committee.

Flange and Tread Contour for Engine-Truck, Driving and Trailer Wheels.—The investigation which has been conducted to date shows that it would be entirely feasible, and very desirable when viewed from the standpoint of economy, to have a single standard contour to be used on all wheels of both locomotives and cars. Eight roads report using flanges 1 in. high on driving and trailing wheels of freight locomotives. Six of these roads use flanges 1 in. high on driving and trailing wheels of passenger, as well as freight, locomotives. The experience of these railroads is ample to demonstrate the entire safety of flanges 1 in. in height on driving and trailing wheels of both passenger and freight locomotives.

The benefits of the reduced height of flange are sufficient that the Committee feels warranted in recommending that Fig. 2, page 7, Section "F" of the Manual, be revised to call for 1 in. instead of 1⅛ in., height of flange. The committee also recommends cooperation and further study with the Committee on Wheels that will lead to the development and adoption of a single flange and tread contour that will be adopted for all wrought-steel and steel-tired wheels of both cars and locomotives.

The sub-committee report was signed by H. H. Lanning (chairman), S. Zwight, H. M. Warden, Geo. McCormick, J. C. Hassett, and E. C. Anderson.

Eccentric Cranks.—The Committee's inquiry among various railroads has developed information to the effect that the design of eccentric cranks used in connection with valve gears of the Walschaert, Baker, and other types, which derive motion from main crank pins, is not a particularly live issue at this time, but it appears that more or less trouble, in the maintenance of these cranks, has been experienced on practically all railroads. The trouble experienced in each case seems to have taken one or more of the following forms: (a) Crank arms loose on main crank pins; (b) breakage either through the portion of crank arm surrounding the main pin or in the middle member connecting main-pin end with eccentric-rod end; (c) Keys working out of main pin fit and catching eccentric rod; (d) Threaded ends breaking off eccentric-rod crank pins.

The experience of most railroads reporting information to the committee has been that two bolts are necessary to prevent crank arms from becoming loose on main pins. Two roads recommended the use of two keys in addition to two bolts in cranks, as per Fig. 3. The main pin end shown on Fig. 3 appears to be most widely used, but the number of locomotives owned by roads recommending the construction of Fig. 4 is almost equal to that of roads favoring construction of Fig. 3. One railroad reports having abandoned the construction of Fig. 3 in favor of that of Fig. 4, while another railroad has taken exactly the opposite course.

The eccentric-rod end of Fig. 6 appears to be far more generally used than any other.

In view of the information set forth above, the committee recommends crank designs in which the construction of Figs. 3 and 4 are both included so as to provide for optional use. The construction of Fig. 6 is recommended for the eccentric-rod end; however, Fig. 7 is also shown for optional use. Crank arms designed in accordance with the committee's recommendations are to be made preferably of forged medium steel, in accordance with A.R.A. standard material specifications for axles, shafts and other forgings. However, the designs shown are satisfactory for electric cast steel. If forged, eccentric cranks made in accordance with these designs should be finished all over.

[The detail design recommended by the committee is omitted —EDITOR.]

The report of the sub-committee was signed by H. H. Lanning (chairman), S. Zwight, H. M. Warden, Geo. McCormick, J. C. Hassett, and E. C. Anderson.

Unification of Screw Threads

A review has been made by your committee of the screw thread standards shown in the 1924 report of the American Standards Association, designated therein as the "American Standard," and in the 1928 report of the National Screw Thread Commission, designated the "American National."

These studies have for the present been confined to screw threads for bolts, machine screws, nuts, and commercially tapped holes, though the future scope of work for this and other committees working on screw-thread standards may properly include those of special diameters, pitches, and lengths of engagement, screw threads for pipe, hose couplings, and other threads such as are now included in the activities of the National Screw Thread Commission.

For study and comparisons a table is included in this report showing the present A.R.A. threads and the "American" standards previously referred to.

As a result of its studies, particularly as to the screw-thread requirements of locomotives, this committee believes it practical and desirable to bring the A.R.A. Standard into harmony with that of the American Standards Association, except that it may be desired to retain three sizes, 1⅜ in., 1⅝ in., and 1⅞ in., omitted in the "American Standard." The change from three and one-half to four threads per inch for the 3-in. size will, it is believed, result in little or no confusion since bolts of that size are used but little on locomotives, and, since no sizes larger than 3 in. are listed in the new Standard, the present A.R.A. 3¼-in. to 6-in. Standard can be retained.

The National Screw Threads Commission and the American Standards Association have, as an important part of their work, developed a standard nomenclature for all terms descriptive of screw-thread elements, and standard identification symbols for indicating their character on drawings, specifications, stock cards, taps, gages, etc. There has also been established for general use, four classes of screw-thread fits. These, with the tolerances as developed, insure the interchangeable manufacture of screw-thread parts at separated places of production with assurance of a proper precision of fit in assembly. Screw threads have always varied in their precision of fit; however, this condition was not previously subjected to definite classification.

These refinements, while not included in present A.R.A. specifications of standards, are of distinct value and may be advantageously incorporated in new specifications developed.

While your committee reports favorable to the revision and amplification of the A.R.A. Standard to bring it into harmony with or conforming to the general character of the "American Standard," it believes that other committees of the Mechanical Division such as Car Construction, and Automotive Equipment are equally interested and any new Standard promulgated should be the result of the combined efforts of all groups affected. It is therefore recommended that this subject be referred back to the General Committee for submission to other committees of the Mechanical Division, or to a joint committee of all groups interested, including representation from the Engineering and possibly other divisions of the American Railway Association. Through united action, the

report as finally adopted would be with the approval of all groups involved and with the assurance of suitability for all ordinary equipment, apparatus, and structures used by railway companies.

The sub-committee report was signed by A. H. Fetters (chairman), S. Zwight, and L. A. Richardson.

Standardization of 300-Lb. Screw Pipe Fittings for Steam Locomotives

Last year, your committee was requested to follow up the standardization of unions, union ells, etc., with a set of 300-lb. A.R.A. screwed pipe fittings. Your committee learned that the Manufacturers' Standardization Society of the Valve and Fittings Industry and the American Standards Association had already prepared such designs.

Your committee now understands that the designs are completed and will be officially passed upon soon for adoption by the above association. Your committee sees no reason why they cannot be adopted by the A.R.A. as standard at this time. It is recommended that these designs be submitted to the members for adoption by letter ballot, this year, and that the Committee on Specifications and Tests of Materials be requested to prepare specifications covering material, tests and manufacture of these fittings.

The sub-committee report was signed by R. M. Brown (chairman), W. I. Cantley, S. S. Riegel, J. C. Hassett, and G. H. Emerson.

Standardization of 300-Lb. Globe and Angle Valves for Steam Locomotives

Last year, your committee was requested to take up the subject of standardizing globe and angle valves for 300 lb. pressure for use upon steam locomotives. Owing to the large amount of work involved in attempting to prepare designs for numerous sizes of valves, your committee decided that it would be best to start with one size, namely: 1¼ in., in an effort to work out this design of straight globe valve, completely, with the different members of the committee and also with the manufacturers.

It is recommended that this report be received at this convention only as information and that all of the members of the Mechanical Division send to the chairman of the subcommittee any comments or suggestions they may have upon the design in order that your committee can continue the work with the object of presenting a proposed standard for globe and angle valves to the convention in 1932.

The sub-committee report was signed by R. M. Brown (chairman), W. I. Cantley, S. S. Riegel, J. C. Hassett, and G. H. Emerson.

Design of and Repairs to Locomotive Springs

The Sub-Committee on Springs and Repairs to Springs submitted a supplementary report which will be helpful in the working of instructions contained in the 1929 report. The first installation of this system was started in 1925 and gradually developed, well established and had been running for a considerable period when the report in 1929 was made.

A prominent railroad when the subject was first investigated was confronted with a great accumulation of defective springs awaiting repairs, the plant being worked night and day to keep up with maintenance. Now the conditions have reversed and there is an accumulation of springs which have been made and repaired and in stock for service, and the broken springs are a matter of no concern.

It should be borne in mind that the system as recommended in the previous report applies to carbon-steel spring plates, and carbon-steel springs consistently manufactured by this process will stand test in which the set has been completely absorbed and reversed below the horizontal plane in deflection without failures after repeated application. In the case of double elliptic springs, the bands can be brought together and released repeatedly without failure. Springs which have developed failures, upon investigation, have generally shown that some defect existed in the steel or surface of the plate.

A further source of failure discovered is due to mixing the steel in the assembly of the plates of the spring wherein it has been found that alloy-steel plates have been made up with carbon steel. It was discovered that these alloy-steel plates can be readily detected when plates are in the heating furnace, showing a darker color than the carbon-steel plates when removed.

The sub-commitee report was signed by G. H. Emerson (chairman), H. A. Hoke, and W. G. Black.

The report was signed by W. I. Cantley, (chairman), mechanical engineer, L. V.; H. H. Lanning, (vice-chairman) mechanical engineer, A T. & S. F.; H. A. Hoke, assistant mechanical engineer, Penna.; G. McCormick, general superintendent motive power, S. P.; J. C. Hassett, mechanical engineer, N. Y., N. H. & H.; E. C. Anderson, mechanical engineer, C., B. & Q.; W. G. Black, mechanical assistant to the president, C. & O.; C. E. Brooks, chief of motive power, C. N. R.; G. H. Emerson, chief of motive power and equipment, B. & O.; A. H. Fetters, general mechanical engineer, U. P.; S. Zwight, general mechanical superintendent, N. P.; R. M. Brown, superintendent motive power, N. Y. C.; H. M. Warden, mechanical superintendent, M-K-T.; S. S. Riegel, mechanical engineer, D. L. & W., and L. A. Richardson, general superintendent motive power, C., R. I. & P.

Discussion.—The discussion indicated approval of the recommendations of the committtee for some reduction in the pressure of wheel fits. It was stated that many roads have had trouble with cracked wheels, largely due to the effect of expansion of the axles from hot journals. Such discussion as bore on the question of flange and tread contours supported the committee in its recommendation that a single flange and tread contour be developed for both car and locomotive wheels. In the matter of securing crank arms to main crank pins, the question was raised as to why the committee submitted two recommended designs rather than a single design and why keys were not depended upon to take the shear rather than the two types of bolts recommended by the committee.

Differences in water conditions, resulting in varying valve lubrication difficulties, were said by the committee to justify the submission of the two designs. The difficulty of producing sufficiently-tight fits on the keys when the crank arm is applied over the key was given as the reason for not depending upon the key to retain the crank arm in its correct position on the pin. When keys are applied after the crank arm is in place, they frequently work out and cause failures of the eccentric rods.

In presenting its proposed design for 300-lb. globe and angle valves, the committee asked for instructions as to the desirability of proceeding with the development of complete standard designs. A motion was carried instructing the committee to proceed with such designs and it was suggested that the yoke-type of valve be considered for use with high-pressure superheated steam, in addition to the bonnet-type shown by the committee. The entire report of the committee was submitted to letter ballot.

Storage-Battery Capacity Rating

A method for rating the capacity of lead and nickel-iron storage batteries was presented and recommended by the Committee on Locomotive and Car Lighting. Rate of charge, voltage limits, temperature, specific gravity and name plate data are specified. The report is identical in substance with that prepared by the Association of Railway Electrical Engineers and published in its proceedings, in its Manual of Recommended Practices and also in the October, 1930, issue of the Railway Electrical Engineer.

The committee consisted of W. E. Dunham (chairman) superintendent car department, C. & N. W.; E. P. Chase, assistant engineer, Penna.; H. A. Currie, electrical engineer, N. Y. C.; E. Wanamaker, electrical engineer, C. R. I. & P.; A. E. Voigt, engineer car lighting., A. T. & S. F.; F. O. Marshall, electrical engineer, Pullman Company; P. J. Callahan, supervisor car and locomotive electric lighting, B. & M.

Action.—The report was accepted and submitted to letter ballot.

Report on Car Construction

This committee gave consideration to a variety of subjects during the year and the report consists of several sub-committee reports dealing with specific subjects.

Design of Recommended-Practice Cars

Single Sheathed Box Cars—Inasmuch as no change in clearance outline has been made since the last convention no changes were made in this design.

Double Sheathed Composite Box Cars—Last year's report stated that the demand was for a single-sheathed composite car or a double-sheathed steel car and that consideration would be given to the omission of the double-sheathed composite car from the Supplement to the Manual. The sub-committee made this recommendation in the event that an increased clearance

outline is adopted and box-car designs are increased in size.

Steel Double-Sheathed Box Cars—The question of clearance outline is still unsettled therefore the sub-committee has not gone ahead with the design.

Composite Automobile Cars—The question of clearance outline is still unsettled and the sub-committee has not made any progress on the design. Recommendations were made for a single sheathed composite automobile car with 12-ft. clear door openings, staggered, one design 40 ft. 6 in. inside length and the other 50 ft. 6 in. inside length, both 50 tons capacity.

Self Clearing Hopper Cars—All drawings for 50- and 70-ton hopper cars, class 4D-HT-2 and 4E-HT-2 have been completed, including alternate design of narrow end construction, and are now shown in the Supplement to the Manual dated March, 1930.

The Wine Railway Appliance Company, Toledo, Ohio, holders of certain patents which affect the narrow end construction of hopper cars, has made a waiver of patent rights to railroads or car owning companies which are members of the American Railway Association, copy of this license being on file in the office of the Secretary of the American Railway Association, 30 Vesey street, New York, where it can be referred to and consulted by anyone interested. The scope of this waiver covers only the specifications contained in drawings attached to Circular No. 2838, issued by the American Railway Association on July 1, 1930.

Fundamentals of Car Design—No changes involving the basic method of calculation were made during the year. Investigation by individual roads of the weight-reducing possibilities of alloy steels is suggested. The use of such alloy steels in new cars initiates the suggestion that some provision should be made to avoid the substitution of lower strength materials when repairs are made.

Equipment Clearances and Maximum Outline of Proposed Recommended-Practice Cars—A questionnaire has been sent out to all roads requesting information that would enable representatives of the Mechanical Engineering Transportation and Traffic divisions of the A. R. A. to select a satisfactory limiting outline for a car having 9 ft. 2 in. inside width; 10 ft. inside height and 50 ft. 6 in. inside length. Questions have arisen as to the information necessary, and a recheck of the entire matter is required. As soon as the satisfactory limiting outline is decided upon the work of completing the various car designs will be carried forward.

Center-Plate Height—In view of the recent developments in the design of car parts and the possibility of the use of trucks having normal capacities in excess of those now in use no reduction is advisable in the present standard truck center-plate height of 26¾ in. Therefore, the sub-committee reports, the dimension will be maintained.

Letter-Ballot Items

It is recommended that the following items be submitted to letter ballot:

Truck Bolsters, Design-Test Requirements—When the present design-test requirements for truck bolsters were adopted in 1926 it was intended to cover all truck bolsters whether of cast steel or built-up type. At that time there was some question as to the possibility of built-up bolsters being made to meet these requirements. In order to give time to develop the situation with respect to built-up bolsters a note was shown on the title page of the specifications as printed in Section A of the Manual, exempting built-up bolsters from the specifications.

No form of built-up bolster has been submitted which will meet the requirements. It is therefore, recommended by the committee that this note be omitted from the specifications, effective March 1, 1932.

Stake Pockets for Flat Cars.—Since the adoption of stake pockets for recommended practice in 1928 shown on page 28-A, section C of the Manual, the Committee has been instructed to revise the drawing to show rounded corners to prevent cutting wires, cables and other fastenings. It was also felt that pockets should be redesigned for greater strength and that the cast pocket secured with U bolts eliminated.

The Committee has accordingly prepared a design, increasing the depth of outside wall and another design with pressed ribs, decreasing the thickness of material from ½ in. to ⅜ in. minimum and specifying round edge material.

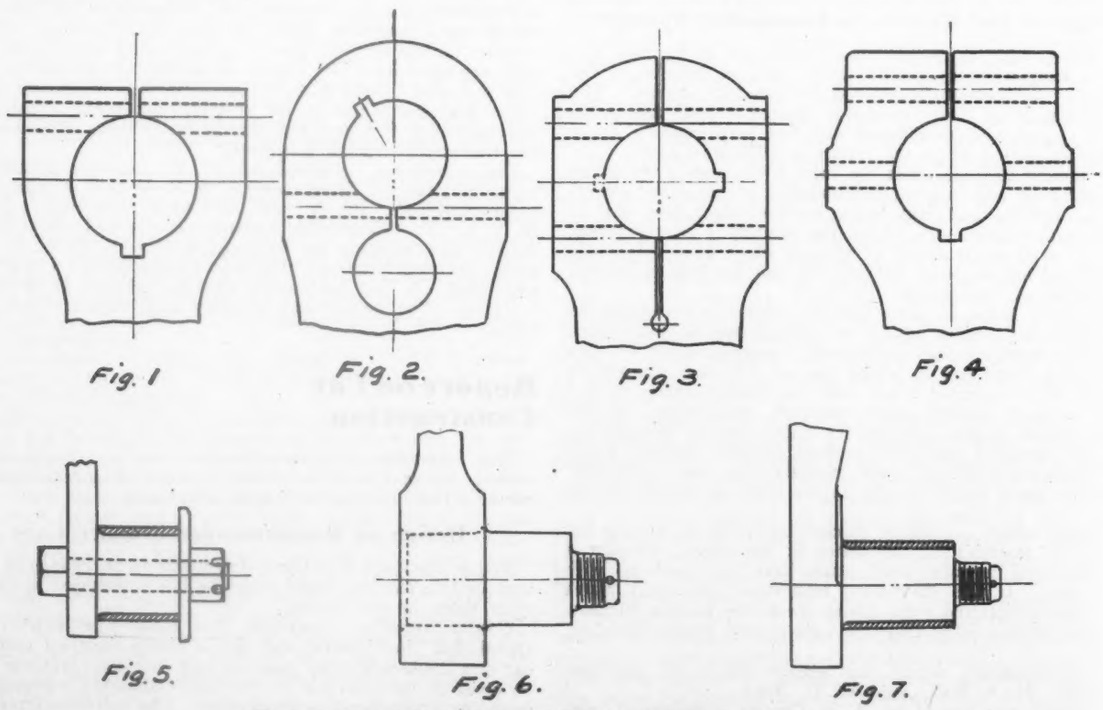
Elimination of Pressed-Steel Journal Boxes.—Recommendation is made that Rule 3 be amended to prohibit the application to new cars after January, 1933, and that existing cars so equipped cannot be accepted from owner after January, 1938.

Journal Box and Pedestal.—In accordance with instructions received from the Car Construction Committee, the sub-committee has redesigned the journal box for the 5-in. by 9-in. journal, as shown between pages 22 and 23, Section D, in the present manual, so that it may be used with the flat-face pedestal and can be manufactured with or without liner. The sub-committee has also designed a flat-face pedestal for the 5-in. by 9-in. and 5½-in. by 10-in. journal box.

Design of Journal Wedges.—Recommendation is made that the note on page 25, section D of the 1928 Manual be revised to read "Wedge shall be of forged or cast steel," thereby eliminating the malleable-iron wedge.

Limits for Coupler Heights on Passenger Cars.—It is recommended that the following be referred to letter ballot for adoption as standard.

For passenger-carrying cars: Nominal height, 34½ in.; maximum height, 35 in.; minimum height of coupler, 33 in.



Types of eccentric cranks according to classes of connections

Load-carrying passenger equipment cars shall meet I.C.C. and A.R.A. requirements for coupler height, as prescribed for freight cars.

Definitions and Designating Letters for Freight Cars.—Attention has been called to the fact that the symbol "RP"—Iceless Refrigerator, is incomplete in that it covers only cars where protection is provided against heat. It appears that a number of cars of this type have been constructed which provide protection against both heat and cold.

In view of the above, it is recommended that the definition for "RP" car as now shown in Section L of the Manual be changed to read in accordance with the following proposed form: "RP—Iceless Refrigerator. A house car equipped with insulation, with or without means of ventilation, and provided with apparatus or other device for furnishing protection against heat and/or cold."

Brine Valves and Operating Rigging, Rules For.—In order to allow greater latitude in the design and construction of brine tanks and their accessories and to be in conformity with present day practice, the Car Construction Committee recommends that rules covering this subject adopted as Standard in 1922 and shown on pages 10-A and 10-B, Section L of the Manual, be modified. It is recommended that the present rules be allowed to remain without change but be supplemented by the addition of the following note: "Cast- or pressed-steel parts will be considered permissible alternates whenever malleable iron is mentioned in the above rules and it will also be permissible to weld, instead of rivet and solder, all brine-tank joints."

The sub-committee on the design of truck springs reports that the work on designs of coil springs for 50- and 70-ton capacity cars having greater capacity than the present designs is progressing but has not been completed.

The sub-committee on rail-motor-car axles reports progress and expresses the hope that definite designs can be submitted within the next year.

As a result of the increasing use of roller-bearings under cars and locomotives the committee has been approached by several manufacturers with reference to a permissible increase in axle load at the journal on A.R.A. axles equipped with roller bearings. Inasmuch as an increase in permissible load would increase the stresses at the wheel seat and at the center of the axle, the whole question, pertaining to both cars and locomotives, will be given careful consideration during the ensuing year and will be referred to the committee in charge of A.R.A. axle design for an analysis of the stresses and their recommendation.

The sub-committee on loading devices in automobile cars is conducting an investigation with a view to preparing designs of representative devices suitable to the various types of automobile cars and when completed will be issued, with recommendations, in circular form.

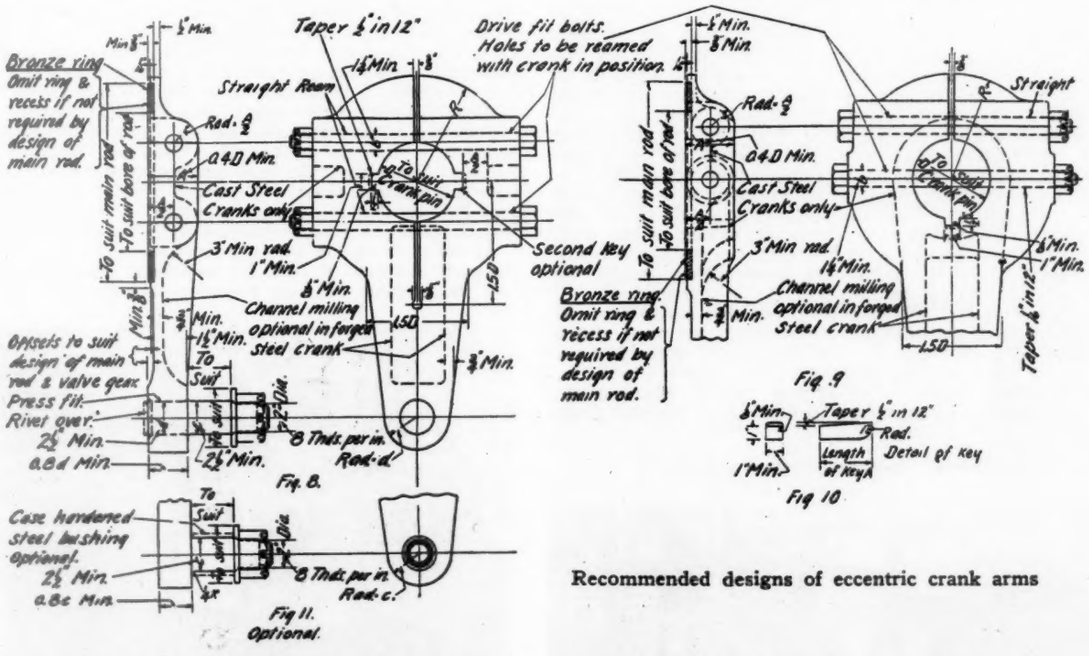
The sub-committee on thermal checking of rolled-steel wheels is working with the wheel committee and the brake committee in an effort to determine the causes of excessive thermal checking. There is a possibility that an improvement in brake-beam construction used with the rolled steel wheel to reduce the tendency of the brake shoe to overlap the outside edge of the wheel rim or the changing of the spacing of the brake shoes so that they will run closer to the flange of the wheel may offer some solution to the problem.

The sub-committee on journal-box lids is co-operating with manufacturers of side frames and box lids with a view to preparing specifications and can only report progress at this time.

Axle Loads—Interchange Rule 86.—In the Annual Report of the Committee for the year 1930, reference was made under the above heading to the fundamental principles of A.R.A. Interchange Rule No. 86, and a table presented showing the effect on axle loads due to variations in weights of wheels. It is the recommendation of the committee that, in view of complications which inevitably would result if variations in weights of various types of wheels were to be considered, no change be made in the present method of arriving at the rail-load limits as prescribed in interchange Rule No. 86 for the various sizes of axles.

The report was signed by P. W. Kiefer (chairman), chief engineer motive power and rolling stock, N. Y. C.; W. A. Newman (vice-chairman), chief mechanical engineer, C. P. R.; A. H. Fetters, general mechanical engineer, U. P. System; C. L. Meister, mechanical engineer, A. C. L.; J. McMullen, superintendent car department, Erie; F. A. Isaacson, engineer car construction, A. T. & S. F.; W. O. Moody, mechanical engineer, I. C.; C. B. Smith, engineer tests, B. & M.; T. P. Irving, engineer car construction, C. & O.; S. O. Taylor, master car builder, Mo. P.; G. S. Goodwin, assistant general superintendent motive power, C. R. I. & P.; J. J. Tatum, general superintendent car department, B. & O.; E. B. Dailey, engineer car construction, S. P.; B. S. Brown, assistant engineer, P. R. R.; K. F. Nystrom, superintendent car department, C. M. and St. P. & P., and J. P. Laux, superintendent motive power, L. V.

Action.—The report was accepted and necessary recommendations referred to letter ballot.



Recommended designs of eccentric crank arms

Electric Rolling Stock

The major part of the report of the Committee on Electric Rolling Stock consists of a tabulation, showing the electric locomotives placed in service during the year ending June, 1931. The table lists the principal locomotive characteristics and includes ten locomotives for the New York, New Haven & Hartford, four for Chile, 14 for Switzerland, five for Norway, eight for Russia and 12 for Italy. This table was compiled with the cooperation of the Heavy Traction Committee of the American Electric Railway Engineering Association.

The report also records the completion of the Cleveland Union Terminal and Delaware, Lackawanna & Western electrifications and the installation of 43 three-powered, oil-battery-electric locomotives. Thirty-five of these have been placed in service on the west side lines of the New York Central, four on the Michigan Central, two in the LaSalle street, Chicago, terminal of the New York Central and two for switching service in conjunction with the Lackawanna electrification.

Concerning the development of alternating-current traction motors, the report states: "Electrification of certain sections of railroad has made some progress during the year, and it is the thought of the committee that the progress will be more rapid in that a satisfactory single-phase, alternating current motor for locomotives has been designed. This new type motor is the result of the combined efforts of the two largest electrical manufacturing companies and they are now in position to build motors with identical characteristics and dimensions, which will permit interchangeability."

The committee consisted of R. G. Henley (chairman) superintendent motive power, N. & W.; J. H. Davis, chief engineer electric traction, B. & O.; J. V. B. Duer, electrical engineer, Penna.; J. W. Sasser, superintendent motive power, Virginian; R. Beeuwkes, electrical engineer, C. M. St. P. & P.; L. C. Winship, electrical engineer, B. & M.; H. A. Currie, electrical engineer, N. Y. C., and A. L. Ralston, mechanical superintendent, N. Y. N. H. & H.

Action.—The report was accepted.

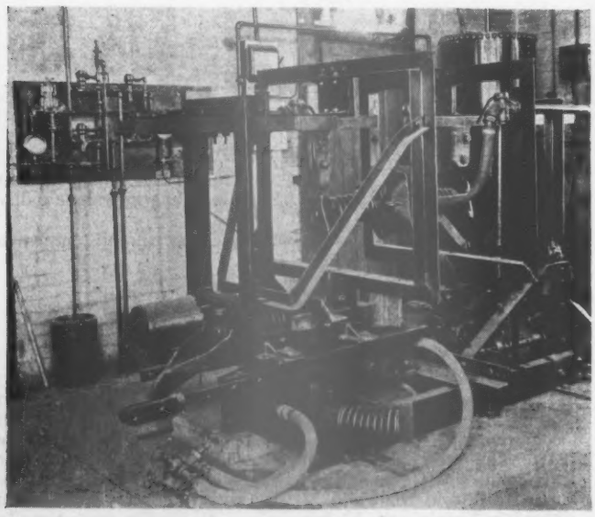
Safety in the Shop

By Charles G. Sebrell*

In introducing his paper Mr. Sebrell pointed out the need of the supervising officer being thoroughly sold on the idea of safety himself before attempting to sell the idea to the organization. The efficient supervisor of today, he stated, must become thoroughly acquainted with the viewpoint of his men, hold friendly meetings with them and frankly solicit honest constructive suggestions. He stressed the need of a clean and orderly shop as a fundamental requirement of safety. Observance of goggle rules, he stated, was not brought about over-night nor have the improvements thus far made been easy of accomplishment. However, selling to the workman the idea that goggles were his individual insurance against any impairment of his vision has accomplished results that are gratifying both to the men and to the management.

In conclusion, Mr. Sebrell pointed out that safety must not be regarded as a philanthropic undertaking, but must also be considered as good business. The basic need in accident prevention, he said, is "supervision with a super vision," an ability to observe what is transpiring, and an efficiency that will stop minor irregularities before they become major offenses.

* Shop Safety Supervisor, Atchinson, Topeka & Santa Fe.



The oscillating machine for studying connector action due to horizontal and vertical movements

Train-Line Connectors

In September, 1929, the joint committee on Automatic Train-Line Connectors representing the American Railway Association, the Bureau of Safety of the Interstate Commerce Commission and representatives of the four train-service brotherhoods, agreed that an investigation of automatic train-line connectors, including laboratory tests and road tests under actual service conditions should be made. This investigation was to be made by the American Railway Association cooperating with the Bureau of Safety and the train-service brotherhoods. The joint committee of the American Railway Association appointed a sub-committee to have direct supervision over the conduct of this investigation composed of the following members: C. E. Chambers, chairman of sub-committee, and chairman of Committee on Safety Appliances; R. L. Kleine, chairman of Committee on Couplers and Draft Gears; G. H. Wood, chairman of Committee on Brakes and Brake Equipment.

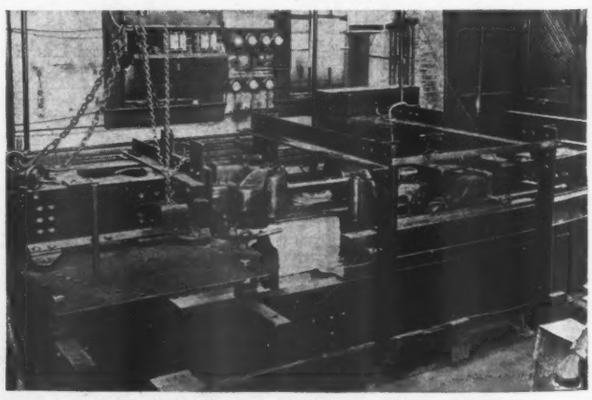
In undertaking this investigation the policy was adopted of making it extensive and complete and of giving each device the same opportunity to qualify for the tests as any other device. Forty-one companies or individuals have submitted plans, or specifications for our consideration. These plans are submitted to searching analysis and those devices having sufficient merit are being purchased in small quantities for testing in the laboratory.

Tests

Devices Purchased for Test—Up to the present time six freight and six passenger connectors of each of the following types have been ordered: Robinson wing type, Robinson Connector Company; Robinson pin-and-funnel type, Robinson Connector Company; American, Consolidated Connector Company; Roberts, Roberts Automatic Connector Co., Ltd.; Workman-Robinson, Workman-Robinson Company; National, National Connector Company; Cobb, Cobb Connector Company.

Prices have been requested on six freight and six passenger connectors from the McTaggart Connector Company, and the Johnson Connector Company, but orders for these connectors have not yet been placed. A further study of the specifications may indicate that the devices proposed by other manufacturers should be obtained and submitted to the laboratory tests.

At the start of this investigation there were no specifications covering the requirements for automatic train-line connectors and no schedule of tests for these devices. A schedule of



The impact machine representing the installation of couplers; draft gears and automatic train-line connectors on the ends of two cars

laboratory tests was prepared and copies forwarded to the Bureau of Safety, Interstate Commerce Commission, and to members of the committee having the matter in charge for the railroads. Criticisms and suggestions were invited and the schedule revised to include the suggestions received.

Testing Machines—Two testing machines, designed to carry out the tests specified in the schedule, were purchased and installed in the laboratories of Purdue University. The No. 1 or impact machine represents the installation of couplers, draft gears and train-line connectors on the ends of two cars. On this machine the action of the connectors is being studied with the drawbars in various positions of height, angularity repre-

senting laterally curved track, and in different positions of lateral off-set.

The No. 2 or oscillating machine is designed to study the action of the connectors and the wear on their various parts due to continual coupling and uncoupling and due to horizontal and vertical movements such as would be produced on a moving train.

[The report indicates that laboratory tests have already been made or are in progress on Robinson wing type and pin-and-funnel type freight connectors, the American freight connector and the National freight connector, and will be continued until each type which will be purchased has been tested.—EDITOR.]

The laboratory tests should select those devices which have sufficient merit to warrant their further study under actual service conditions in road tests.

The report was signed by H. A. JOHNSON, director of research, A.R.A.

Action.—The report was accepted.

Brakes and Brake Equipment

Our inspection of some reclamation plants reveals the fact that there are numerous types or designs of brake beams of varying dimensions, all of which, no doubt, originally met the brake-beam test requirements. These various dimensioned brake beams quite naturally came into existence due to the absence of definite and fixed dimensions.

The brake beam manufacturers undoubtedly sought to give the best possible brake beam for the lowest possible cost, which prompted them to employ structural shapes and designs most conveniently obtained. It is only fair to state that the railroads, for the most part, purchased brake beams from the most favorable quotations regardless of the type, quality of material or workmanship, thus contributing their share to the present conditions. Therefore, of necessity the present condition involves one of two things where standardization is desired, i. e., the railroads must carry stocks of the many varieties, shapes and styles of brake-beam parts in order to maintain the brake beam designs that the present market provides, or scrap such beams and their parts removed from cars in interchange as will not interchange to the road's standard.

For many years the A. R. A. manual has shown the association's standard brake beam not only by important dimensions, but also by shape of parts and their structure, but the necessary details for standardizing have been absent. Therefore, we have made no change in the present standard except to add thereto additional information so as to provide for complete details of standard No. 2 plus brake beam. In preparing these details we sought to specify such materials as are commercially obtainable, and such dimensions as may be conveniently met. The workmanship and inspection, in our opinion, will be a matter for the purchaser.

[The committee here included drawings giving recommended detail dimensions of standard No. 2-plus brake beam parts and devoted several paragraphs to an explanation of the reasons for the design and dimensions shown. It suggested the adoption of these details as recommended practice and called attention to the fact that A. R. A. brake-beam gages would need corresponding revision. In order to protect brake-pipe and signal couplings against damage by being incorrectly connected to signal-hose and brake-pipe-hose dummy couplings, respectively, the committee recommended two designs of dummy coupling which can be readily distinguished one from the other. The Subcommittee on Standardization of Contour Lines and Steam-Hose Couplings made a careful survey of general coupler-head conditions, finding much irregularity, and recommended a definite radius of the gasket seat in the coupler head as well as certain other details of construction, and gages for checking new heads. The committee studied the location of air, signal, train-line and steam-head pipe on passenger-equipment cars, finding a wide variation in practice without any apparent reason in most cases. A drawing showing a recommended standard location was included in the report. The committee reported that the new triple-valve graduating spring, adopted last year, is not being applied as rapidly and generally in freight equipment as desirable in order to eliminate undesired emergency action during service operation, and recommended that the older type springs be removed and scrapped whenever triple valves are cleaned and repaired.—EDITOR]

This committee was requested to cooperate with the committees on wheels and car construction in investigating the subject of thermal-checked steel-tread wheels, and in joint session at Chicago on April 8 it was the consensus that in-so-far as concerns brakes and brake equipment, the situation might be relieved somewhat through: Improvement in brake beam constructions and design, so as to reduce the tendency of brake shoes to overlap the outside edge of the wheel rim; better maintenance of foundation brake gear on trucks to reduce tendency of brake shoes overlapping outside edge of wheel rim; improvement in quality of brake shoes to eliminate, or minimize, groove cutting in wheels which in turn is conducive to thermal checking.

The question of brake shoe material is a broad one, and we believe should be investigated jointly by the Committees on Wheels, Specifications and Tests for Materials, and Brakes and Brake Equipment.

The report was signed by G. H. Wood (chairman), supervisor air brakes, Atchison, Topeka & Santa Fe; T. L. Burton, air brake engineer, New York Central; B. P. Flory, superintendent motive power, New York, Ontario & Western; R. C. Burns, assistant engineer, Pennsylvania; W. J. O'Neill, general mechanical superintendent, Denver & Rio Grande Western; W. H. Clegg, chief inspector air brake & car heating equipment, Canadian National; Mark Purcell, general air brake inspector, Northern Pacific; R. B. Rasbridge, superintendent car department, Reading; G. E. Terwilliger, supervisor auxiliary equipment, New York, New Haven & Hartford; M. A. Kinney, general master mechanic, Chesapeake & Ohio; H. A. Clark, general air brake inspector, Minneapolis, St. Paul & Sault Ste. Marie.

Discussion.—Representatives of several railroads concurred in the opinion that the weakest point in present brake-beam design is the brake head, which is too rapidly cut out by the brake shoe, owing to the lack of adequate bearing surface between the shoe and the head. A design of brake head improving this condition, which was developed by J. McMullen, superintendent of the car department of the Erie, and submitted to the Committee on Brakes and Brake Equipment by the Car Construction Committee, was commended by representatives of railroads which have applied heads of this type. In view of the strong sentiment for the improvement of this feature of the brake-beam design it was referred back for further development jointly by the Committee on Brakes and Brake Equipment, the Car Construction Committee, and the Committee on Specifications and Tests for Materials. In view of the belief that many reclaimed brake beams are going into service which are not of adequate strength, a motion was carried that the committee be asked to develop standards to which rebuilt or repaired brake beams must conform.

The remainder of the report was submitted to letter ballot, as recommended by the committee.

Report Arbitration Committee

During the year Cases 1656 to 1683, inclusive, have been decided and copies forwarded to the members.

As announced in the report to the 1929 Annual Meeting, investigation has been made to ascertain if it would be practicable to reduce billing costs by elimination of detail labor charges and overhead, and the use of an arbitrary percentage to be added to the material costs. The report of the sub-committee on this subject is attached. As a result of analysis of the data accumulated in this study, your committee has approved the recommendation of this sub-committee that the proposed plan be abandoned.

Rule 2—The committee recommends that Section (j) of this rule be modified to include section (d) of the Safety Appliance Acts to definitely indicate reason for rejecting equipment in violation of Section (d) of this Act.

Rule 3—The committee recommends that no extension be made in the effective date of fifth paragraph of Section (b). The committee recommends that note following first paragraph of Section (c) be modified, effective August 1, 1931, to authorize use of the Type E coupler adopted as recommended practice by letter ballot.

The committee recommends that the effective date of the last sentence of Section (d) and that the effective dates of the first and second paragraphs of Section (f) be extended to January 1, 1933.

The committee recommends that the exception in the fifth paragraph of Section (t), governing the interchange of cars used in transporting commodities such as asphalt, fuel oil, lubricating oil, be modified to include those cars used in transporting syrup, corn oil, molasses, grease, soap stock etc.

The committee recommends that no extension be made in the effective date of the sixth paragraph of Section (t) and that the same be modified, effective August 1, 1931, to except tank cars used in transporting commodities such as lard, soap stock, grease, molasses, syrup, etc., and so stenciled.

The committee recommends that the effective date of the

seventh paragraph and eighth paragraphs of Section (t) be extended to January 1, 1933. It is the intent that no further extension of the requirement in the eighth paragraph of Section (t) will be granted.

The committee recommends, as a safety measure, a new last paragraph to Section (t), to read as follows:

Proposed Form—(t) (12) Tank cars with dome covers not secured to tank by means of hinge or chain will not be accepted after January 1, 1933. From Owners.

Rule 4—The committee recommends that Section (c) of this rule be modified, as follows:

Proposed Form—(c) Refrigerator cars. When sheathing is split, broken, raked full width of board into wood to bottom of bead, or when raked into wood to lesser depth *(whether or not full width of board)* if *such* rake damage is in excess of four inches *measured vertically, or where combined vertical width of two or more such rakes is in excess of four inches (within a vertical distance of twelve inches).* (Bottom of bead on A. R. A. Standard sheathing is ⅛-in. below outside face of sheathing.)

The committee recommends that Section (f) of this rule be modified by adding the following phrase to the Section as it now stands: *"or in the case of box or stock cars, single-sheathed, where the bending of posts or braces by raking prevents the proper operation of side doors."*

The committee recommends that Section (g) of this rule be modified as follows:

Proposed Form—(g) All Cars. Metal end sill when straightening of same is necessary for proper operation of uncoupling apparatus, or dumping device; to restore safety appliances to original alinement *or to repair cardable directly associated defective parts.*

The committee recommends the addition of new second paragraph to Section (g), to read as follows:

Proposed Form—Defect card shall not be required for damaged push-pole pocket when not directly associated with other delivering-line defects.

The committee recommends that Section (j) of this rule be modified, as follows:

Proposed Form—(j) When a car is received home with unfair usage defects covered by defect card; or in any other cases where cars damaged by unfair usage are interchanged with visible defects covered by defect cards; upon arrival of cars at owners' shops, if it develops that there are associated defects due to unfair usage, joint inspection, within 90 days after first receipt of car home, *shall* be made by representative of car owner and a representative of a disinterested railroad, or by a chief interchange inspector, showing list of the defects covered by the defect card as well as list of additional *associated* unfair usage defects *which, in their opinion, occurred at same time (except interior fire damage per Rule 32, Section "k").* Such joint inspection certificate shall be forwarded to the road *issuing the defect card who shall issue defect card* to cover such additional defects.

Rule 8—The committee recommends that a note reading "Must not have carbonized back" be added to the wheel and axle billing repair card forms shown on pages 220 and 221 of the current Code of Interchange Rules. Carbonized backs deface billing repair cards and are unsuitable for filing purposes.

Rule 9—The committee recommends that third requirement opposite item of "A. R. A. couplers, or parts thereof, R. & R." be modified, effective August 1, 1931, as follows:

Proposed Form—(Where 12¼-in. head coupler, A. R. A. type D coupler *or A. R. A. type E coupler* is removed or applied, it must be so stated.)

Rule 17—The committee recommends a new paragraph to Section (c) of this rule, effective August 1, 1931, to read as follows:

Proposed Form—Type E Recommended Practice coupler, or coupler having type D head designed with swivel or radial butt, should be replaced in kind when available; otherwise same may be replaced with A. R. A. Standard type D, 6 by 8-in. shank couplers, and such substitution shall not constitute wrong repairs.

Rule 32—The committee recommends that the third paragraph of this rule be modified to apply to tank cars equipped with bolster of center anchorage. Damage of this nature to cars equipped with head-block anchorage should properly be the responsibility of the car owner.

The committee recommends the addition of a new seventh paragraph to this rule, to read as follows:

Proposed Form—Friction draft gear missing complete in interchange, including followers when missing in connection therewith, or when wooden block is substituted for draft gear. (The substitution of springs and followers for friction draft gear will be considered wrong repairs and cardable only by company applying same.)

The committee recommends that Section (a) of this rule be modified, to include *loose* as well as broken, bent or missing part causing derailment in order to definitely indicate responsibility in such cases.

The committee recommends that Section (o) be modified by eliminating the word "Also" at the beginning of the second paragraph, to clarify the intent of the rule.

The committee recommends that Interpretation No. 7 to this rule be modified, as follows:

Proposed Form—(7) Q.—Is a car owner responsible for steam inlet and *steam* outlet caps missing from tank cars?

A.—Yes, except as otherwise provided in this rule.

Rule 35—The committee recommends that last sentence of note following this rule be modified in the next supplement, as follows:

Proposed Form—Doors equipped with locks having two notches must be engaged and locked in second notch *on at least one side of door (providing maximum opening does not exceed three inches),* to be considered safely secured in closed position.

Rule 36—The committee recommends that the third paragraph of Section (1) be modified to include the statement: "No card with red background permitted." To avoid confliction with I.C.C. Regulations for Transportation of Explosives and other dangerous articles. This recommendation has been approved by the Transportation Division, American Railway Association.

The committee recommends, that, for same reason given above, the following sentence be added to the second paragraph of Section (2) of this rule: "No printing in red type or in any color on red background permitted."

Rule 44—The committee recommends that to clarify the intent, Section (1) of this rule be modified by including the following sentence: "(Any sill broken partly old at point of breakage will not be considered in this combination.)"

The committee recommends that to clarify the intent, Section (2) be modified as follows:

Proposed Form—Composite wooden and steel underframe cars. When five or more *steel or wooden* longitudinal sills are damaged, providing three or more *of the steel or wooden* longitudinal sills are broken *entirely* new *at point of breakage.*

The committee recommends that Section (3) and Interpretation 2 to this rule be eliminated, and Section (5) modified, as follows:

Proposed Form—(5) All-steel underframe cars having two *or more* steel longitudinal sills. *When two steel center sills are damaged between body bolsters.* When the damage is confined to the sills between the end sill and body bolster, owner will be responsible, providing after investigation it is found that car was not subjected to unfair handling as provided by Sections (a), (b), (c), (e), (f), (m) and (o) of Rule 32.

Reason—To eliminate side or intermediate sills as combination factors on all-steel underframe cars. It is felt present Rule 44 affords more protection to steel underframe cars with weak center-sill construction but having side sills, than it does to the more substantial A. R. A. center-sill construction without the side sills, while the impact shocks are not transmitted to the side sills in steel underframe construction but are concentrated upon the center sills. The use of all longitudinal sills as combination measure in wood underframe and composite wood and steel underframe, is consistent, in view of the end sill and body bolster transmitting the impact shocks to all such sills in more or less degree.

The committee recommends that to clarify the intent, Section (6) be modified as follows:

Proposed Form—(6) Steel tanks of tank cars, where secured by bolster or center anchorage, *if shifted account of all anchor bolts, or rivets being sheared off. Note.—Tanks shifted account elongation of bolt or rivet holes, where any of the bolts or rivets are still in place, is owner's responsibility.*

Rule 60—As a measure of economy and to expedite the work when the spray method of painting is employed, the committee recommends that section (f) of this rule be modified as follows:

Proposed Form—(f) All old cleaning marks must be scraped off and painted over with quick-drying paint, *preferably black.*

The committee recommends that Section (i) of this rule be modified, as follows:

Proposed Form—(i) In the event air brakes *are* cleaned, due to *being* inoperative, within nine months from date of last previous cleaning, car owner is responsible, except under the following conditions:

1. If cleaned *by same road* within sixty days from date of last previous cleaning, charge for such subsequent cleaning is not permissable, except where *due to* broken cylinder, triple valve body or check valve case, account owner's responsibility.

2. If cleaned *by* different roads, or *by* private car lines, within sixty days from date of last previous cleaning charge for such previous cleaning (per Items 18, 23 and 29, Rule 111) shall be withdrawn; except where last cleaning was occasioned by delivering line defects, or *due to* broken cylinder, triple

valve body or check valve case, account owner's responsibility.

3. Where last previous cleaning was due to delivering line defects (for which no bill was rendered against owner), the road performing same shall issue counter-billing authority for the expense of the subsequent cleaning, if performed within sixty days from date of such previous cleaning, upon presentation of copy of billing repair card of road rendering bill against owner, except where such subsequent cleaning was due to broken cylinder, triple valve body or check valve case, account owner's responsibility.

4. In any case, where *such subsequent* cleaning *within sixty days is performed* by car owner, joint evidence per Rule 12 shall be used to establish the defective condition which occasioned such cleaning.

Rule 87—The committee recommends that to clarify the intent, the phrase, *"on basis of sufficient evidence,"* be eliminated from the fourth paragraph.

Rule 102—The committee recommends that the third sentence of the second paragraph of this rule be modified to read:

Proposed Form—The same scale will apply to width, except for matched sheathing, roofing, lining and flooring, *on which for finished width up to and including 3½ in., consider as 4 in. rough; over 3½ in. up to and including 4½ in., consider as 5 in. rough; over 4½ in. up to and including 5½ in., consider as 6 in. rough; and upward on corresponding scale.*

Rule 104—The committee recommends that fourth paragraph of this rule be modified, effective August 1, 1931, as follows:

Proposed Form—In the case of *type "E" Recommended Practice coupler, or* swivel butt coupler (including swivel butt casting and pin), or radial butt coupler (including radial butt casting), removed account defective, credit for second-hand parts shall be at 75 per cent of prices new as shown in Rule 101. In case of complete *type "E" Recommended Practice coupler or coupler having type "D" head designed with swivel or radial butt, missing under the provisions of Rule 95, and substituted with A. R. A. type "D" Standard 6 by 8-inch shank coupler, the car owner shall be allowed credit, if any, for the difference in value between second-hand coupler missing and second-hand value of coupler applied.*

Rule 113—On account of the order of the Interstate Commerce Commission, I.C.C. Docket No. 17,801, relative to Per Diem Rules, the committee recommends that the second paragraph of this rule be eliminated, effective August 1, 1931. Your committee will give further consideration to this subject.

Rule 120—The committee recommends that repair limits for labor on car body per Section (b) of this rule be modified, repair limits for labor on tank cars complete be $50 and Section (d) modified as follows:

Proposed Form—(d) In no case shall the total charge for actual repairs to body *of all-steel or steel-underframe cars, or tank cars complete,* exceed the estimate by more than $50, *or on other types of cars by more than $25,* exclusive of betterments, unless authorized.

Reason—To provide greater measure of protection against heavy repairs to units which car owner may not desire to maintain; also, to provide limits for repairs to tank cars without authority from car owner.

[The proposed limits for labor charges on car-body repairs, included in tabulated form under Section (b) of Rule 120, not included here, show for each type of car of wooden construction a reduction under the present allowances. The reductions vary from 25 per cent to 50 per cent of the present allowances.—EDITOR]

Passenger Rule 2—The committee recommends that the effective date of the first sentence of Section (c) of this rule be extended to October 1, 1932 since the present situation justifies the extension.

The committee recommends that a new Section (d) be added to this rule, to read as follows:

Proposed Form—(d) Effective January 1, 1933, where cars are equipped with platform safety chains, same shall be located as follows: When facing end of car, the chain fitted with hook shall be on the left-hand side, and the chain fitted with eye on the right-hand side.

Passenger Rule 7—The committee recommends the addition of a new fifth sentence to Section (j) of this rule, to read as follows:

Proposed Form—Triple valve may be cleaned separately if defective within time limit, including separate stenciling.

The committee also recommends that a new note be added to Section (j), to read as follows:

Proposed Form—Note. When U-12-BC type of U. C. control valve is removed, it should be replaced in kind, or, if replaced by U-12 or U-12-B valve, proper credit must be allowed car owner as outlined in notes following Item 20-C of Passenger Rule 21. In the substitution of the U-12-BC valve for defective U-12 or U-12-B valve, car owner is not responsible for the betterment.

Passenger Rule 8—The committee recommends that Section (g) of this rule be modified to include metallic steam-heat connector since these connectors should receive the same protection as missing steam hose.

Passenger Rule 9—The committee recommends that a new note be added to Section (d) of this rule, to read as follows:

Proposed Form—Note. For terminal lubrication on passenger equipment cars in through line service, an arbitrary allowance of fifty cents (labor and material) per car, shall be charged.

Report of Sub-Committee on Cost of Car-Repair Billing

An analysis of 1,559 monthly incoming bills showed that the percentage of labor to material, as appearing in these bills, fluctuated from approximately 41 per cent to 72 per cent, while the weighted average percentage of labor to material in all such bills was 51.7 per cent.

The theory is that to the material charge for straight repairs appearing in a bill, the weighted average of 51.7 per cent should be added as representing labor. It was decided by the sub-committee that such an arrangement would not work out equitably for all concerned.

The question of including bills rendered on authority of defect cards on a similar basis was also considered but on account of the exceptionally wide range of percentage labor to material it was decided the proposed plan would be highly inequitable and therefore impracticable of application.

From an analysis of the accumulated data covering this subject, the sub-committee is unanimously of the opinion that the plan for adding an arbitrary percentage to material costs to cover labor, in lieu of the present detailed labor charges, should be abandoned.

The report of the Arbitration Committee was signed by T. W. Demarest (chairman), general superintendent motive power, P. R. R.; L. Richardson, chief mechanical officer, B. & M.; F. W. Brazier, assistant to general superintendent motive power and rolling stock, N. Y. C.; J. J. Hennessey, assistant superintendent car department, C. M., St. P. & P.; G. E. Smart, chief of car equipment, C. P. R.; C. T. Ripley, chief mechanical engineer, A., T. & S. F.; G. F. Laughlin, general superintendent, Armour Car Lines; Thos. Beaghen, Jr., superintendent car maintenance, Mexican Petroleum Corporation.

Discussion.—A somewhat extended discussion followed the reading of the report by Chairman Demarest. In connection with the welding of car axles, one of the members stated that his road has followed the general practice of building up worn collars by welding for several years, and asked if any failures as a result of this method of reclaiming car axles have occurred on any roads. Apparently no such failures are recorded, but the opinion was expressed that in the interests of safety all welding of every description on car axles should be eliminated, and it was stated that reforging to the next smaller journal diameter with the formation of complete new collars and standard journal lengths not only is practicable from the point of view of economy, but refines and anneals the metal, making it superior to that in the new axle.

The question of cross-billing and the exchange of "wooden money" as a result of present methods of billing for repairs to foreign equipment came in for a lengthy discussion. The cost of this billing on American railroads was stated to be in the neighborhood of $3,500,000. The feasibility of eliminating billing entirely has been considered by the Arbitration Committee and prominent executives in the Mechanical Division for years, the stumbling block being what to do in the case of privately-owned equipment. The suggestion was advanced that in case it proves impracticable to do away with billing entirely, a large proportion of the work can be eliminated by reducing the number of items for which bills can be rendered. The idea was also advanced that possibly central or regional billing bureaus, provided with the latest equipment and methods, could be established as clearing houses to eliminate individual road billing.

In closing, Chairman Demarest invited an informal expression of opinion regarding the four following questions:

Are you in favor of the entire elimination of car-repair billing?—Considered impractical.

Do you favor a continuation of present billing methods, modified so as to reduce the volume of work?—Approved.

Should the number of car repair billing items chargeable to the owner be reduced?—Generally approved.

Should the Arbitration Committee give further consideration to the possibilities of developing central or regional bureaus, under the supervision of the American Railway Association, to serve as clearing houses and eliminate individual road billing?—Approved.

The report was accepted and ordered submitted to letter ballot.

Prices for Labor and Material

Rule 101—All miscellaneous material prices in Rule 101 were rechecked as of March 1, quotations from purchasing agents of eleven railroads, representing 39 per cent of total freight-car ownership in the United States and Canada, indicating a general downward trend in material markets.

New Item 54-B is recommended to cover credit for scrap triple valves. New Items 124-A to 124-J are recommended, covering charges and credits for type E coupler and parts thereof. New Item 200 is recommended, covering the 200,000-lb. capacity axle. Two new items have been added and one item revised in table of friction-draft-gear prices, to cover additional types of such gears. The prices of a number of gears shown in this table have also been revised.

Investigation by your committee of weights used for new and scrap wheels and axles in setting up A. R. A. material prices, developed some modifications necessary; and the new average weights obtained as a result of this investigation have been used in setting up new allowances for these items in both freight-car Rule 101 and passenger Rule 22.

Investigation has been conducted by your committee in conjunction with the Purchases and Stores Division, as to correctness of percentages for store expense and interest on investment used in making up material prices for the Interchange Rules. The precentages being used for this purpose are correct and no change is recommended at this time.

No change is warranted at this time in the hourly labor allowances.

Rule 107—Item 159 is eliminated, account confliction with Rule 108.

Rule 111—Item 4 is modified, by eliminating the words "retaining valve," to clarify the intent.

Rule 112—Recommendations are made in Rule 112 respecting reproduction pound prices of new freight-train cars of all classes in order that Supplement of August 1, 1931, may reflect 1930 costs in lieu of 1929 figures shown in present Code. The prices submitted for your approval will be found to follow the trend which occurred in the 1930 market covering total new equipment purchases as compared to 1929. Pound prices for refrigerator and tank cars are based on figures furnished by representative roads and private lines in the United States and Canada. Prices for all other equipment represent the average selling prices set up by the President's Conference Committee, which secured quotations on total output of several large U. S. car manufacturers.

Passenger Rule 21—Item 17-A is eliminated, account covered by new Items 38-D and 38-E of passenger Rule 22. In order that car owner may be properly compensated in substitution of U-12-B for U-12-BC type of control valve, your committee is recommending new last note under Item 20-C to provide proper credit in such cases. New Item 20-H is added to provide charge for separate cleaning of safety valves.

Passenger Rule 22—Changes in material prices in a number of items under this rule are recommended, based on quotations as of March 1 from the purchasing agents of eleven representative railroads. Item 35 covering coach oil is eliminated and Item 34 modified to cover all lubricating oil. New Items 38-A to 38-E, inclusive, are recommended to provide charges and credits for metallic steam connectors and parts thereof.

[The changes recommended in the existing rules are shown in detail in tables which are not included here.—EDITOR.]

The report was signed by A. E. Calkins (chairman), superintendent rolling stock, N. Y. C.; Ira Everett, consulting master car builder, L. V.; F. J. Dodds, general car inspector, A. T. & S. F.; P. Kass, superintendent car department, C. R. I. & P.; O. A. Wallace, supervisor car repairs, A. C. L.; T. J. Boring, general foreman, M. C. B. Clearing House, Penna.; H. H. Harvey, general car foreman, C. B. & Q.; H. H. Boyd, assistant chief motive power and rolling stock, C. P. R.; A. E. Smith, vice-president, Union Tank Car Company; A. H. Gaebler, superintendent car department, General American Transportation System, Inc.

Action.—The report was accepted.

Automotive Rolling Stock

The Automotive Rolling Stock Committee devoted its efforts for the year 1930-1931 to activities which could be handled by correspondence. Notwithstanding certain limitations extensive data were collected on three subjects of interest to the railroads operating rail motor cars, as follows: 1. Rail motor cars put in service since 1923; 2. Depreciation of rail motor cars and equipment; 3. Crank-case oil reclamation.

Questionnaires were sent out and replies received from 115 railroads. Among these 115, sixty-two operate rail motor cars and include practically all of the principal operators of such equipment in North America. Hence, the information obtained can be considered quite representative.

Rail Motor Cars Put in Service Since 1923—The committee presented a table giving in considerable detail information concerning all of the rail motor cars which have been placed in service since 1923. Up to and including 1930 the total number of such cars placed in service was 730. The table shows the cars by ownership and gives the year placed in service; the type and capacity of the power plant; the overall length of the car; the lengths of the engine, baggage, mail and passenger compartments; the seating capacity, and weight.

Depreciation—Three questions were submitted to the railroads requesting information on depreciation practices.

Of the 62 railroads reporting on their rail motor cars, 60 stated such cars were depreciated. One railroad reported no established rate for depreciation and one railroad reported no depreciation of rail motor cars. Of the 60 railroads, 27 reported using an over-all depreciation rate covering both car body and motive-power apparatus. Such over-all rate varied from two per cent to fifteen per cent with a mean rate of about 6.5 per cent. The remaining 33 railroads reported different rates applied to car body and motive-power apparatus. Car body depreciation rate varied from 1.8 per cent to six per cent with a mean rate of about four per cent. Motive power apparatus depreciation rate varied from 3.288 per cent to 20 per cent with a mean rate of about 10 per cent. There was a disposition on the part of a few railroads to apply depreciation rates differently or in more detail.

Crank-Case Oil Reclamation—Included in the questionnaire sent out to the railroads were seven questions relative to the reclamation of crank-case oil. Of the railroads questioned 25 reported reclaiming crank-case oil. Two railroads stated that such reclamation was performed by an outside agency. The remainder reported no reclamation of crank-case oil. A variety of makes and types of apparatus was used for such reclamation.

Among the 24 railroads reporting definite cost per gallon for reclamation, the minimum cost was 8.4 cents per gallon and the maximum 24 cents, with a mean of about 15.5 cents per gallon. This cost is quite significant as it indicates the substantial saving over the cost of new oil which can be realized by the reclamation of used crank-case oil.

The consensus of opinion relative to comparison of reclaimed oil with new was that the former compared about equally well with new oil.

The report was signed by P. H. Hatch (chairman) engineer of automotive equipment, N. Y., N. H. & H.; H. F. Finnemore, assistant electrical engineer, C. N. R.; B. N. Lewis, mechanical superintendent, M., St. P. & S. S. M.; F. K. Fildes, assistant engineer, P. R. R.; W. J. Wilson, chief motor-car draftsman, U. P.; J. R. Jackson, engineer of tests, M. P., and E. Wannamaker, electrical engineer, C., R. I. & P.

Action.—The report was accepted.

Report of Wheel Committee

The Committee recommends that the specifications, adopted as standard in 1917 and revised 1926, be again revised and submitted to letter ballot as standard practice as follows:

Section 2, paragraph (c)—The depth of clear white iron shall not be less than ½ in. and shall not exceed 1⅛ in. at the throat or 1¼ in. at the center line of tread. The bending of clear white iron with the grey iron behind it shall be without any distinct line of demarcation. The depth of clear white iron shall not vary more than ¼ in. around the tread in any one plane in the same wheel. These limits apply to all weights of wheels.

Section 4, paragraph (b)—Insert after second sentence—"The plane of the flange when gaged on the face of ⅝ in. above the base line of tread, shall not vary more than 1/16 in."

Section 5, paragraph (d)—If test wheel cracks in the plate with nine blows or less, it will be considered as having failed.

Section 5, Table II—Increase height of drop for 850 lb. wheel to 15 ft.

The committee recommends that the present standard specification for chilled iron wheels, adopted 1917 and revised 1926, be again revised in accordance with the above recommendations and submitted to letter ballot for adoption as standard practice.

Foundry Practice Requirements

14. Chill test block—(a) A chill test block must be taken at least once out of every ten wheels poured. The size of the test bar shall be 1½ in. wide, 3 in. to 4 in. thick and 6½ in. to 8 in. long, 1½ in. face to be placed against the chiller.

(b) The depth of chill measurement shall be recorded in sixteenths.

15. Analysis test block—(a) A test block 3 in. by 3 in. minimum section and 4½ in. minimum in length shall be cast, preferably in dry sand, one test bar poured from the first and one from the last tap, and at least two bars from intermediate parts of the heat.

(b) The drillings shall be obtained from the end of the test block. The first drillings shall be discarded, the drilling continued, and the resultant chips, etc., dumped from the hole and taken for sample, or the block may be broken and the drillings taken at the point of fracture.

(c) An analysis may be made for each block and recorded, or, at the option of the manufacturer, the samples may be mixed of equal quantities, but at least one analysis shall be made to represent the day's heat.

27. Drop test—In addition to the requirements b and c of paragraph 5 above, the Manufacturers' "Standard Practice for Foundries" specifies: "In addition to the above, care should be taken to see that the tup falls free in the guides and that the supporting bosses are solidly anchored to the large base plate and so located that only the back of the flange rests on them. The space between the hub of the wheel and the base plate shall be kept free from sand and broken pieces of wheel."

"The tup shall weigh 250 lb. when first placed in service, and shall be removed when found to weigh less than 247 lb."

"The drop tests shall be to destruction. (After 36 blows the height of drop may be increased or big drop used.)"

28. Thermal tests—In addition to the specification requirements, the Manufacturers' "Standard Practice for Foundries" specifies: "The wheel shall be observed for at least 10 minutes after the rim is poured to note and record any structural failure."

30. Tape lines—In addition to the specification requirements, the manufacturers' "Standard Practice for Foundries" specifies: "Tape lines should be checked daily on a car wheel used as a master. This wheel shall be an exact tape 3 as checked by the Association Master Tape Line. The exact weight of the master wheel should also be determined and the correct weight stamped on same, so that it may be used for checking the scales used for weighing the new wheels."

Chilled iron wheels—One of the changes recommended is the addition of a clause restricting variation in plane of the flange to 1/16 in. It is not the intention to suggest the checking of each wheel by inspectors to detect this defect but the clause should be inserted as protection in case the condition is encountered at any particular wheel foundry. Generally, warpage is discovered in the wheel plant or when the wheels are chucked in the boring mill. Paragraph 137 of the Wheel and Axle Manual will be amplified so as to provide a check on warpage when the manual is revised.

The attention of the committee has been directed to the condition of some of the second-hand wheels applied to foreign equipment. A considerable number of wheels are reported as out of round and thin chill. The committee will cooperate with the Arbitration Committee in an investigation of this question.

Worn-thru chill cast-iron wheels—Considerable difficulty has been arising on certain railroads, due to breakage of cast iron wheels, which have worn through the chill. It appears that a considerable number of wheels are being permitted to run and in some cases wheels are possibly being applied to cars which have this worn-through chill condition. Inspectors should be warned to keep a close watch for this defect.

The committee called attention to the importance of the new proposed Rule 83, which prohibits the application of wheels of weights of less than 650 lb. and 700 lb. nominal weight, regardless of date cast. The light-weight wheels are not sufficiently strong to meet modern operating conditions and it is felt that it is a mistake to apply them to any cars. Considerable numbers of such wheels are accumulated on roads where old equipment is being scrapped. The only safe usage for such wheels is in work equipment. The Wheel Committee, therefore, recommends that no extension in date be granted for this rule and that it should become effective January 1, 1932.

The vertical-flange height limit of 7/8 in. for chilled-iron wheels under cars of 80,000-lb. capacity and over should be modified for the standard reinforced flange, single-plate wheels. The committee is in touch with a test now under observation to confirm the practicability of this change and expect to have ample information at hand to support a further recommendation in the report for 1932.

A general improvement in wheel-mounting practice is reported since the introduction of the Wheel and Axle Manual. It is apparent, however, that some shops are not as yet equipped with standard mounting gages.

Removal of Wheels Which Have Not Reached Condemning Limits

The 1930 annual report of the committee called attention to the loss occasioned by delays to loaded equipment due to condemning wheels close to, or even at, the condemning limits. A list of the defects which the committee considers should be permitted to remain in service until the loaded car reaches destination, follows:

Chilled iron—Flange worn, vertical flange, brake burned, tread worn hollow, nominal weights less than 650, 700 and 750 lb., and nominal weights less than 650 and 700 lb.

Wrought steel—Flange worn thin, vertical flange, thermal cracks, high flange, and tread worn hollow.

The Arbitration Committee has been advised of our suggestion with the thought that a rule might be incorporated into the interchange rules to better the present situation.

Worn-Through Chill—The committee has referred to the worn-through chill defect from time to time in previous annual reports and plans to investigate this defect further this year. The number of wheels reported as worn-through chill varies considerably on different railroads and it is apparent that the rule is being abused at some points. On the other hand some wheel shops do not seem to inspect second-hand wheels as closely as is desirable and some out-of-round and thin-chill wheels are applied and removed within a comparatively short period. The committee is arranging to have some wheels of this type accumulated for examination and it is hoped that a gage may be developed which will aid in better classification of this defect.

Brake burn in cast-iron wheels and thermal checks in wrought-steel-tired and cast-steel wheels—Some confusion is reported in connection with a distinction between brake burn in cast-iron wheels and thermal checks in wrought-steel, steel-tired and cast-steel wheels. It is suggested that the Arbitration Committee transfer the reference to cast steel wheels from the first paragraphs of Rule 75 (P.C.7) referring to brake burn, to the second paragraph of Rule 75 referring to thermal checks. The development of this defect is similar in cast steel and wrought steel and steel-tired wheels and should not be classified or treated the same as brake burn in cast-iron wheels.

Rim thickness for cast-steel wheels—The committee has been requested to recommend a condemning limit for rim thickness of cast-steel wheels. This has been governed heretofore by the use of cast-iron wheel gages but it has developed that cast-steel wheels may be turned under certain conditions. This practice would result in a reduction in the rim thickness and limits should be established to insure against the application of thin-rim wheels in service. The committee is not prepared to make a final recommendation in this report but suggests that the limit through the throat of 1⅛ in. for freight and 1⅜ in. for passenger service, established for wrought-steel wheels in Fig. 4, Page 258, of the interchange rules, should be considered as minimum condemning limits for cast-steel wheels until the committee has had an opportunity to conduct tests and make a final recommendation.

The report is signed by A. Knapp (chairman), inspecting engineer, N. Y. C.; C. T. Ripley, chief mechanical engineer, A. T. & S. F.; O. C. Cromwell, assistant to chief of motive power and equipment, B. & O.; H. W. Jones, general superintendent of motive power, central region, Penna.; H. W. Coddington, engineer of tests, N. & W.; J. Matthes, chief car inspector, Wabash; C. Petran, supervisor of tools and machinery, C. M. St. P. & P., and A. M. Johnsen, engineer of tests, Pullman Company.

Action.—The report was accepted.

Report on Tank Cars

During the year the committee considered approximately 125 dockets and applications for approval of design, covering 1518 cars, of which 1155 were Class I.C.C.—103.

Forge Welding—During the year question was raised as to whether certain methods of forge welding fully met the intent of the specifications for class 105 cars. The tank car committee have under way at the present time a comprehensive series of tests of welded containers made by different methods of forge welding.

Dome Closures for Class I. C. C. 104A Cars—During the year the committee started some studies of the various designs of dome closures used on Class 104A cars, with a view to mak-

ing certain recommendations which will tend to standardize these closures, and at the same time not unduly restrict development of the art. It is hoped to complete this work during the coming year.

During the past year the chief inspector of the Bureau of Explosives proposed certain revisions in the regulations which would make safer the transportation of inflammable liquids having a vapor pressure exceeding 16 lb. absolute. The committee concurred in Colonel Dunn's recommendation, and this has made it necessary to do considerable work in connection with checking over designs of dome closures proposed to replace generally the present screw type cover, and which would meet the new regulations.

Reversible Placard Holders on Tank Cars—For some time there has been discussion about the requirements for placard holders on tank cars. The committee now presents a design, which is free from patents and seems to meet fully all of the requirements of a reversible placard holder. The committee recommends that on and after January 1, 1932, all tanks, which are applied to new underframes, shall be provided with permanent metal placard holders at least equal to this design, and that on all cars receiving general repairs these, or equal metal placard holders be applied. The particularly desirable feature of the arrangement is that the cards are easily applied without the use of tacks, and it is almost impossible to lose them. The committee recommends that this proposed rule, and the drawing, be submitted to letter ballot for action by the association.

Specifications for Class A. R. A. 203 Cars.—When the tank car specifications were submitted to letter ballot last year, it was thought unnecessary to provide a separate specification for Class 203 Cars. It was concluded later that the 203 specification in effect should be included, and the following note was inserted in the specifications for tank cars to cover the 203 design:

> "Tank Cars required for the transportation of commodities not covered by the Regulations for the transportation by rail of explosives and other dangerous articles by freight are required to be built in accordance with I. C. C. Shipping Container Specification 103 but may be equipped with approved appurtenances or appliances necessary to the transportation of such commodities in tank cars.
>
> "All tanks so built shall be stenciled A. R. A.—203 .....only. The blank to specify the particular commodity requiring the special appurtenances or appliances in question."

Weight of Loaded Tank Cars at Rail.—During the year the committee has had one or two cases in which, due to later deciding to handle a heavier commodity in a tank car than that for which it was designed, it was found that the trucks would be overloaded. The heaviest commodity which will ever be handled in these cars should be used in determining the total weight at rail so that a suitable capacity truck will be used. It is not considered a safe practice to load tank cars less than shell-full.

New Developments.—During the year there have been several rather special types of cars built, requiring special material or treatment to prevent either contamination of the article carried or rapid deterioration of the tank structure itself. There may be mentioned the following:

1—6,500-gal. tank with lead lining.
3—40-ton, 3,000-gal., Class ICC-105A300 unlagged cars for transportation of ethyl fluid.
1—40-ton, 6,000-gal., Class ICC-103-B insulated tank car for transportation of formaldehyde.
1—40-ton, 5,000-gal., Class ICC-103, five compartment car for transportation of petroleum products.
4—100-ton, 12,000-gal., Class ICC-103-A cars for transportation of sulphuric acid.
1—Ethyl fluid tank car for transportation of ethyl compound.
2—Three-plate aluminum, Class ARA-201A35, tank cars for transportation of glacial acetic acid and formaldehyde.
3—8,000-gal., nickel-clad tank cars for transportation of iron-free caustic soda.
4—8,000-gal. double-wall tank cars with stainless-steel inner tanks.

Specification 107 Helium Cars.—This specification is in the process of revision, looking toward possibly three specifications, one for thick-walled vessels (walls 2½ in. and over) one for thinned-walled vessels (walls less than 2½ in.) and one for autogenously welded construction.

The report was signed by G. S. Goodwin (chairman), assistant to general superintendent motive power, C. R. I. & P.; A. G. Trumbull, chief mechanical engineer, C. & O.; George McCormick, general superintendent motive power, S. P.; F. A. Isaacson, engineer car construction, A. T. & S. F.; W. C. Lindner, chief car inspector, P. R. R.; G. A. Young, head, school of mechanical engineering, Purdue University; A. E. Smith, vice-president, Union Tank Car Company; T. Beaghen, Jr., superintendent car maintenance, Mexican Petroleum Corporation; F. G. Lister, assistant superintendent motive power, St. L. S. F.; G. E. Tiley, supervisor tank car equipment, General Chemical Company; C. C. Meadows, Tidal Refining Company.

Action.—The report was accepted and referred to letter ballot.

Committee on Loading Rules

As a result of the investigations, your Committee submits the following recommendations for changes and additions in the rules and figures for your approval and submission to Letter Ballot for adoption by the Association.

[The committee submitted a set of instructions prohibiting the use of temporary advertisements on cars and specifying the size and character of routing cards, commodity cards, special placards, symbol and A. R. A. cards, and special cards required by federal or state governments, and regulations concerning their use, which it proposes for inclusion in the Loading Rules because of requests from several shippers. In some cases the shippers have supplied themselves with a card which did not comply with Interchange Rule 36, and when their attention was called to this fact they stated that if they had known this they would have complied with the rule.—EDITOR].

General Rules for Loading Materials

Rule 4 Proposed Form—Cars *shall* be in such condition that the trucks can curve freely and the *average* clearance per side-bearing per truck must not exceed 5/16 in., and must not be less than ⅛ in.

Rule 8—Add the following sentence to Paragraph (b): *"For loads carried as single loads, overhanging one, or both ends, the weight limits shown in Rule 23 will govern."*

This rule has been modified at the request of one of the large steel shippers to provide cross reference to Rule 23, because of Rule 8 requiring the weighing of the load in case of doubt, while Rule 23 sets forth specific allowable weights.

Rule 12—Add the following sentence to Paragraph (a): *"If the length of the material is such that it cannot be loaded without dropping the end gate, necessary blocking must be provided in order to clear end gate."*

Rule 13—Add. "Note 2. *Shipments of long steel, which are liable to sag and take a permanent set due to this cause must have sufficient bearing-pieces applied to prevent sagging."*

Rule 21—Add the following sentence: *"For method of securing operating mechanism of Rotary Types D and E couplers where coupler spacing blocks are required. See Figs. 3, 4 and 4-A."*

Rule 23—Proposed Form: Maximum Weight.—Single Loads Overhanging One End or Both Ends of Car—In *such* loading *the following weight limitations shall govern.*

Note 1: Shipments of long steel, which are liable to sag and take a permanent set due to this cause, must have sufficient bearing-pieces applied to prevent sagging.

Rule 24—Eliminate the note under this rule.

Group II—Rules Governing the Loading of Structural Material, Plates, Billets, Castings, Wheels, Pipes, Etc.

Rules 223, 224 and 224-A—[The committee recommends that the rules and figures be modified to take care of loading of light girders that may become damaged when loaded on more than one car. Also to correspond to more modern methods of loading. Figs. 58, 59 and 60 (not shown here) have been revised and an additional list of materials added, to correspond to the proposed changes in Rules 223, 224 and 224-A.—EDITOR].

Rule 228—It is proposed to eliminate Note 1 from this rule because it conflicts with Rule 30, which permits the loading of gondola cars.

Rule 239—Proposed Form: Paragraph 1. Rails, bar iron, channels, angles, etc., should, whenever possible, be loaded on single gondola cars. *If the length of material is such that it cannot be loaded without dropping the end gates, suitable blocking must be provided to clear the end gates.* If the length of material is such that it can be loaded inside of end gates, they must be raised and securely fastened. [The remainder of paragraph 1 is unchanged—EDITOR].

Rule 246—[The proposed form of this rule is worded to permit loading turntables on two or more cars, forming *triple or quadruple* loads as well as twin loads.—EDITOR].

Rule 249—[The proposed form of this rule permits the loading of pipe from 24 in. to 30 in. in diameter, inclusive.

The number of stakes for loading the pipe at various heights above the car sides remains unchanged although the number used in each case is specified—*"per pile."* Explicit instructions

as to methods of wiring, use of chock blocks, height of stakes, etc., is also given in the proposed form of the rule. It is recommended that Figs. 78 and 79 be eliminated because the requirements covered by them are now included in Fig. 80. The latter is modified and made to include pipe 24 in. to 30 in. in diameter, inclusive.—EDITOR].

Rule 250—It is recommended that this rule be eliminated because all requirements are now included in Rule 249.

Rule 250-A—[The Rule has been modified to state that "intermediate tie wires or bands *"shall be located on top of first tier above car sides"* instead of "as close to the top of the car sides as practicable, but not over 18 in. above top of same," as the present rule reads. The proposed form also states that "additional intermediate tie wires or bands must be applied to stakes at *not more than 30-in.* intervals above the first intermediate tie wire or band" instead of 24-in. as stated in the present rule. Both proposed changes are to be included in both the third and fourth paragraphs. The rule was modified to provide a more suitable location for the intermediate wires.—EDITOR].

Rule 250-B—This rule has been modified to include pipe 30 in. in diameter and to eliminate definite base line of lower tier in upper unit which has been found safe and practicable.

Rule 251—[This rule has been modified to include pipe from 24 in. to 30 in. in diameter, inclusive, which has been found to be safe and practicable. Pipe 12 in. or less also included, thereby, eliminating Rule 258. The reference to Rule 249 for wiring and staking is replaced by complete instructions, in this rule. The use of Saplings is prohibited. Intermediate wire for loads over 3 ft. high has been found necessary and is included for safety.—EDITOR].

Rule 251-A—Proposed Form: Flat and Gondola Cars: Wrought iron pipe *more than 30 in.* in diameter must be loaded in accordance with Figs. 81-E, 81-E-I, 81-F, 81-G, 81-H and 81-I.

When loaded *on flat cars as per* Figs. 81-G, *81-H and 81-I, the side blocking must be backed up with 4-in. by 5-in. stakes fitted into stake pockets, and where possible must extend 14 in. above top of car floor. Where width of load will not permit this, the height of stakes must be sufficient to come in contact with pipe. Where diameter of pipe is such that blocking of sizes specified in Figs 81-G, 81-H and 81-I cannot be used, the blocks must be wedge shaped and side against stakes to be as high as possible.*

Pipe loaded *as per* Fig. 81-G, *must be secured with two rods ⅝ in. in diameter,* or bands of equal strength, with threaded ends, may be substituted with two high tensile strength bands not less than 2 in. in width, or wires having a total ultimate tensile strength of not less than 7,200 lb.

Pipe loaded as per Fig. 81-H and 81-I, secured with three rods ¾ in. in diameter, or bands of equal strength, with threaded ends, may be substituted with six high tensile strength bands not less than 2 in. in width, or wires having a total ultimate tensile strength of not less than 15,000 lb. *Where intermediate cradle blocks are used and rivet holes are available, center tie rod or equivalent, may be omitted, in which case the ends of the pipe must be bolted together. Where more than four high tensile strength bands, or wires, are required per pile, the additional bands, or wires, must be used to tie piles into a unit.*

The number of pieces of pipe in each tier and number of tiers, when loaded in accordance with Figs. 81-H and 81-I, shall be governed by the diameter of pipe.

When not loaded in pyramidal form each pipe must be placed directly in line with the one underneath.

[The next paragraph is the same as in present Rules.—EDITOR].

Note: Riveted pipe that may be damaged by coming in contact with each other must have filler pieces not less than 1 in. by 4 in. of sufficient length, and placed so as to protect pipe from damage by rivet heads.

This rule was modified to more clearly define its intent.

Rule 251-B—Proposed Form: Loading of Wrapped Pipe on Gondola Cars. Fig. 80-C: For pipe less than 25 ft. in length, three pairs of stakes and three skids must be used. For pipe more than 25 ft. in length four pairs of stakes and four skids must be used. When height of load exceeds 3 ft. above car sides, one pair of stakes must be added. Stakes shall not be more than 5 ft. from ends of pipe, and intermediate stake, or stakes, shall be equally spaced between the two end stakes.

Hardwood, 2 in. by 6 in. skids No. 2, shall be about 3 in. shorter than inside width of car. Bands No. 1, shall consist of high tensile strength steel, not less than 2 in. wide, having an ultimate tensile strength of not less than 7,200 lb. They shall be lightly secured to bottom of skids with staples, and long enough to pass around the load so that ends will overlap on top of load.

Hardwood, 4 in. by 4-in. stakes No. 3 must extend from top of skids to top of load, and they shall be placed so that half of their thickness projects beyond the ends of skids. Band No. 1, must be secured to the outside of stakes with suitable metal straps No. 6, so as to permit free vertical movement of the former. Metal straps No. 9, shall be securely attached to outside of stakes and in line with angles on top of car sides, so constructed as to prevent the shearing of bands No. 1. Wrapped excelsior padding No. 4 shall be secured to inside faces of stakes with tie wires No. 5, and padding of baled excelsior must also be placed on top of skids. To keep stakes away from side of car and in proper position while loading, place block No. 8 between stake and side of car near top, and place block No. 7 at same location near bottom. These blocks should be removed after they have served their purpose so that load is relatively free to adjust itself without causing damage to the wrapping on the pipe.

After load has been finished, place sufficient excelsior padding on top of it to prevent damage to pipe wrapping, also cut off the stakes so that the inner sides of same are flush with top of load and beveled towards outer side to permit snug fitting of, and preventing sharp bends in bands. Band No. 1, shall then be placed over the pads on top of load, and they must be drawn equally taut with overlapping ends substantially sealed or welded together.

Note: All excelsior must be entirely enclosed with heavy wrapping paper.

It is recommended that the above rule be included in the Loading Rules to take care of a new condition in the shipment of pipe. Experimental shipments have proven this method safe and satisfactory.

It is recommended that Figs. 81-A, 81-C and 81-D. be eliminated from the Loading Rules because these methods of loading are now taken care of in Figs. 80, 81-G, 81-H and 81-I.

Rule 255—The marginal reference was modified as it should be confined to cast iron pipe.

Rule 258—It is recommended to eliminate this rule because all of its requirements are now taken care of in Rule 251.

Group III—Rules Governing the Loading of Mining Cars, Engines, Boiler Shells, Machinery, Derricks and Similar Commodities

Rule 302—This rule was modified at the request of one of the large tank shippers to define more clearly when end blocking was to be applied. This was done by separating paragraph three into two paragraphs and adding a definite statement to cover all tanks over eight feet in diameter.

Rule 304—[It is recommended that the heading to this rule read: *"Loading of Engines, Tractors, Compressors and Similar Machines, on their own wheels, also Tractors, Wagons, Etc., of the Crawler Type."* Also that general Rule No. 6 be added, which must be observed in addition to the ones specified in the first paragraph of the present rule. This modification is recommended on account of the heavy blocking provided for in Figs. 102 and 103 not being required on tractors, etc.—EDITOR.]

Rule 305—[It is recommended that the following sentence be inserted as the second sentence of the rule: *"Compressors weighing over 8,000 lb. may be loaded as per Fig. 105 and combined harvesters must be loaded as per Fig. 105-F."* This sentence is added to clarify the methods of loading compressors and combined harvesters.—EDITOR.]

Rule 305-A—[It is recommended that the phrase *"weighing 25,000 lb. or less"* be inserted in the first sentence of the rule, specifying the weight of tractors, wagons and similar machines to clarify the rule. It has been recommended to modify the bracing requirements at the rear of the machines shown in Fig. 103-A to provide a bearing piece between the uprights and floor of the car. It is proposed to change the headings to Figs. 104, 105, 105-A, 105-B, 105-C, 105-D, 105-E to state that the equipment shown shall be loaded *lengthwise on the cars.* The wording of Figs. 104 and 105 to coincide with changes in Rules 304 and 305 and the wording of the others to coincide with changes in Rule 305 only. Fig. 105-F is added, new, to take care of loading combined harvesters weighing over 8,000 lb. The word "Engines" has been left out of the heading to Figs. 106 and 106-A to coincide with the change in Rule 305. None of the figures mentioned are included here.—EDITOR.]

Rule 306—The second sentence of Section (e), second paragraph, is changed to read: *Alternate methods may be used by securing the body portion to the crawler structure with two anchors at front and two anchors at rear, or two anchors at outer end of boom, direct to car body, and two anchors at rear of body portion to crawler structure. When these alternatives are used, the machine must be secured to the car with cables or rods of sufficient strength to prevent excess vertical*

motion, except when loaded as shown in drawing Fig. 103-C.

This rule has been modified to take care of alternate methods of loading.

As an additional safety measure the following sentence is added to the note at the end of Rule 306: *"Propelling mechanism must be thrown out of gear and secured in that position, or disconnected."*

Group IV—Rules Governing the Loading of Concrete Culvert Pipe, Brick, Stone, Building Tile and Similar Products

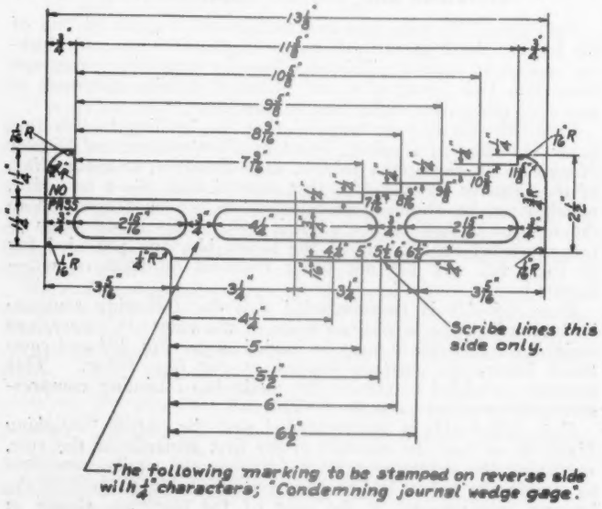
Rules 406, 407 and 408—[As an additional safety measure, in all three of these rules, where mention is made of two stakes being used for securing the load, it is proposed to make them read: " . . . and two pairs of side stakes must be used *per pile 10 ft. or less in length, and three pairs of stakes must be used per pile exceeding 10 ft. in length,* in addition, etc." The remaining parts of all these rules with the exception of the above italicized portion, remain unchanged.—EDITOR.]

The report was signed by Samuel Lynn (chairman), superintendent rolling stock, P. & L. E.; R. H. Dyer, general car inspector, N. & W.; E. J. Robertson, superintendent car department, M. St. P. & Sault Ste. Marie; G. R. Lovejoy, master mechanic, Detroit Terminal Railway; T. O. Sechrist, assistant superintendent Machinery, L. & N.; C. J. Nelson, chief inspector, Chicago Car Interchange Bureau; R. B. Rashbridge, superintendent car department, Reading; W. B. Moir, chief car inspector, Pennsylvania; J. A. Deppe, assistant superintendent car department, C. M. St. P. & P.

Action.—The report was accepted and referred to letter ballot.

Lubrication of Cars and Locomotives

In its 1931 report the Committee on Lubrication of Cars and Locomotives urged that serious attention be given to eliminating the use of inferior grades of oil, which at low temperatures will congeal and cause packing to roll, thus



⅛" Template Steel

Condemning gage for journal bearing wedge

causing a hot box. The report called attention to tests which were now being conducted by a number of oil companies to determine satisfactory grades of car oil. During the coming year the committee expects to complete tests to determine the quality of waste best adapted for feeding oil to the journal and holding oil in suspension. Extensive tests are now in progress to determine whether it is practical to discontinue the use of the back roll.

The committee proposed the following definition of a hot box for adoption as recommended practice: "An overheated journal (commonly known as a hot box) is one that requires treatment or setting out of any car when such hot journal develops between originating point and point of destination of the car on carrying road, irrespective of class of train or point at which car is set out."

The report also contains a method for analysis of reclaimed waste and a journal-bearing-wedge condemning gage. It stated that there were still a number of railroads and private lines using inferior materials in packing of car-journal boxes, and were stenciling the cars to indicate that the box packing had been properly done.

The recommendations for reporting hot boxes, method for analysis of reclaimed waste and the journal-bearing-wedge condemning gage were proposed by the committee for adoption by letter ballot.

That part of the report pertaining to lubrication of locomotives showed progress in the work of the committee to secure further improvements in locomotive lubrication. The use of ⅛-in. perforations in perforated plates, instead of 3/16-in. proved satisfactory in warm climates but not altogether successful at temperatures below freezing. Service tests extending over a period of approximately 18 months on one road, where it is necessary to provide against extreme summer and winter temperatures, have shown that perforated plates with 3/16-in. perforations and follower plates with a spring tension of 75 lb. maximum and 70 lb. minimum at 1-in. height, provide a happy medium. Further tests of split driving-box brasses shown in the 1930 report of the committee reflect improved performance in reducing running temperatures and consequent reduction in the consumption of driving-journal compound on heavy power in fast service. A service test of mechanical lubrication of driving hubs, making use of heavy oil forced to the hubs with a mechanical force-feed lubricator showed good results. A heavy freight locomotive showed less than 7/16-in. wear on the hub liners after 40,000 miles.

A considerable portion of the report was devoted to engine-truck journal lubrication in connection with floating engine-truck bearings. Reports received by the committee show that mechanical force-feed lubrication has effected a substantial improvement in a reduction of the number of hot bearings. The committee also reported good performance of engine-truck and trailer hub lubrication with floating hub liners and grease applied under pressure through the hubs on engine trucks and through the box on the trailing trucks.

The report was signed by G. W. Ditmore (chairman) master car builder, D. & H.; H. W. Johnson, superintendent of motive power and rolling stock, M. & St. L.; P. Maddox, superintendent car department, C. & O.; T. O. Sechrist, assistant superintendent of machinery, L. & N.; A. J. Harner, lubrication engineer, U. P.; M. J. O'Connor, mechanical inspector, N. Y. C.; E. Von Bergen, general air brake, lubrication and car-heating engineer, I. C.; I. T. Burney, lubrication engineer, B. & M.; E. C. Cromwell, lubrication supervisor, B. & O.

Discussion.—The desirability of an A. R. A. gage to check distorted wedges when taken back in the shop and reset was emphasized, and Chairman Ditmore said that the committee would proceed with the development of such a gage during the coming year. A member stated that the most important work of the committee would be the development of specifications for a single oil which would meet both summer and winter conditions satisfactorily; that good results are being secured and that further study and progress should be made.

The extension of the period for repacking car journals on the repair tracks from nine months to 12 or more was suggested, the consensus being that such extensions should not be granted in the case of journal-box packing unless also granted for air-brake cleaning, in order that both of these operations can be performed at the same time. The question of extension of the time for periodic repacking of journal boxes and cleaning of air brakes was referred jointly to the Lubrication and the Brake Committees for a thorough study of all the various factors involved, and the development of recommendations to be submitted at next year's convention. The Lubrications Committee was also asked to amplify its definition of a hot box in order to make all details clear and understood.

The report was accepted and the recommendations referred to letter ballot.

Report on Couplers and Draft Gears

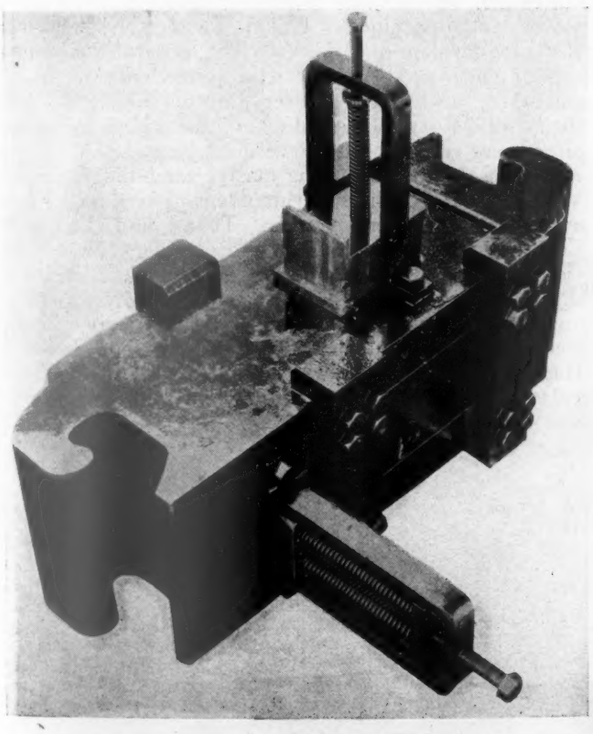
The Committee on Couplers and Draft Gears reported satisfactory results from its study of the operation of the Type-E coupler, and recommend that it be advanced from recommended practice to standard. It is recommended, however, that the Type-D coupler remain as a standard until the Type-E is generally introduced.

A number of designs of uncoupling rigging with the Type-E coupler were submitted by several manufacturers for tests. It was recommended that a type of rigging submitted by the McConway & Torley Company and a second type submitted by the National Malleable & Steel Castings Company be submitted to letter ballot for adoption as recommended practice.

During the year the committee observed the performance of rigid-shank couplers with horizontal attachments; Symington swivel-butt couplers with horizontal attachments, and rigid-shank couplers with vertical cast-steel swivel yokes. With the object of facilitating interchangeability of parts in couplers with swiveling features, the coupler manufacturers have agreed on the manufacture of one type of swivel-butt coupler; namely, the Symington design, which all are privileged to manufacture. This action on the part of the coupler manufacturers made it necessary to develop comparative data as to the strength of the parts involved. Static tests were made in the laboratories of the Buckeye Steel Castings Company and the National Malleable & Steel Castings Company, under the supervision of the committee, of the Type-E coupler, 6¼-in. by 8-in. rigid shank; Type-E coupler, 6¼-in. by 8-in. swivel shank; A.R.A. vertical-plane cast steel yoke; A.R.A. vertical-plane cast-steel swivel yoke; Type-E coupler, 6¼-in. by 8-in. rigid shank and vertical-plane cast-steel yokes, and Type-E coupler, 6¼-in. by 8-in. swivel shank and vertical-plane cast-steel swivel yoke.

Report of Sub-Committee on Draft Gears—The Sub-Committee on Draft Gears continued its car impact tests during the year and the conclusion was reached that, in order to determine the maximum permissible recoil, it will be necessary to conduct road tests. These tests will be made as soon as possible. The sub-committee recommended that Section 11 of the specifications be changed to read as follows:

"*Recoil*—A minimum percentage of recoil, consistent with freedom from sticking, is desirable. The recoil shall be measured and reported for each type of car tested, but this shall be only for the information of the purchaser and no



Ball-impression dynamometer designed and built by the Pennsylvania to measure the force acting between two cars

car shall be rejected solely on account of high recoil until a definite limit is set."

This recommendation, together with supplementary-purchase specifications for improved draft gears for freight service, were recommended for submission to letter ballot for approval as standard.

The report concluded with recommendations that further tests of trains equipped with standard gears, selective-travel, the Alma gear and the Duryea car-cushioning device, be continued by the A.R.A. It also recommended to the manufacturers that attention be given to a solution of the difficulty of applying many types of draft gears owing to the necessity of compressing the friction elements in order to insert the gear in the standard pocket.

The report of the sub-committee on rigid-shank and swivel-butt couplers was presented by H. W. Coddington (chairman), and the report of the sub-committee on draft gears by H. W. Faus (chairman), engineer of tests, N. Y. C. The report of the main committee was signed by R. L. Kleine (chairman), assistant chief of motive power, Penna.; C. P. Van Gundy, engineer of tests, B. & O.; C. J. Scudder, superintendent of motive power and equipment, D., L. & W.; H. W. Coddington, engineer of tests, N. & W.; C. B. Young, general mechanical engineer, C. B. & Q.; Samuel Lynn, superintendent of rolling stock, P. & L. E.; J. P. Michael, chief mechanical engineer, C. & N. W., and C. T. Ripley, chief mechanical engineer, A. T. & S. F.

Discussion.—In answer to a question as to the advisability of advancing the type-E coupler from recommended practice to standard with a relatively limited amount of service experience, Chairman Kleine pointed out that the type-D coupler, since it was first applied in 1914, has been subjected to a constant process of improvement in detail not affecting the interchangeability of the parts, and that the type-E represents the result of this same process of evolution, affecting interchangeability with the parts of the type-D, and that the experience with these couplers throughout this period of development leaves no reason to expect that the type-E will not remain a standard for some time to come.

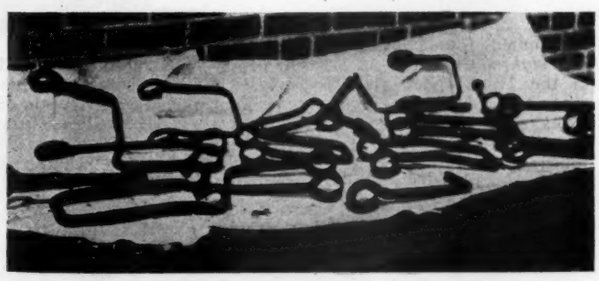
A question was raised as to the necessity for the cross key in the design of swivel-butt coupler with vertical-plane yoke with the use of a separate carrier iron, and it was asked if it would be a permissible alternate to leave out the cross key. Chairman Kleine promised that the committee would take this matter under consideration.

In connection with the preparation of the report on the draft-gear recoil tests, motion pictures were shown illustrating the recoil actions of cars equipped with draft gears of varying percentages of recoil when coupled at varying speeds.

The report was accepted and submitted to letter ballot as recommended by the committee.

Joint Committee On Reclamation

The committee has studied the design of many brake beams now in service, referring particularly to the failures of various parts, and to parts which are not interchangeable. The illus-



Brake-beam hangers showing light construction and wear

trations show representative conditions of defective freight-car brake equipment.

Welded Couplers—The welded couplers and parts shown in the 1930 report have been in service for one year. The equipment has been subject to all kinds of loading and handling, including that in hump classification yards. To date, no failures have developed. The couplers show normal wear and conditions. They compare favorably with new couplers in the same kind and length of service. One railroad, four years ago, applied 200 welded couplers and parts to system ballast cars that would not be handled in interchange. A record of welding was kept of each individual coupler. In addition to this, each coupler was marked with a steel stencil date. To date one coupler has been removed because of wear on the coupler shank by the carrier iron. The data prove conclusively that the welding of certain fractures in couplers is a successful and profitable operation.

Marking Old Material—Most reclaimed and second-hand material is painted or sprayed for protection and, when properly repaired, it is impossible to detect it from new material unless it is marked in some manner. By using the paint color

Coupler with welded face and shank after year's service

Mild-steel brake-beam rods showing breakage at end

scheme and dotting item of material, many discrepancies will be eliminated, and the cost will be much less.

Freight-Car Axles—As a result of recommendations included in the 1930 report, the Mechanical Division committee has recommended that the condemning limit for journal length of axles should be increased. This has been accepted and the new limit is shown in the Interchange Rules. The increased journal length is harmful to the life of the brake beam, and permits increased lateral motion to brake and truck foundations. The brake and truck foundations are most important for the reason that considerable freight car equipment is being dispatched on express train schedules and some of the present design and construction carries a high maintenance cost.

Helical Springs—Accumulative reports have been received from various railroads indicating satisfactory service from reclaimed helical springs. One railroad reports savings effected by reconditioning 5,160 helical springs at its plant, as follows:

66.7 tons spring steel at $10.75 per ton		$717.03
New value of springs		4,045.80
Cost of material to repair	$86.32	
Cost to repair	386.03	
Value of scrap spring steel	717.03	
		1,189.38
		$2,856.42
Cost per ton to recondition	$ 7.08	

The report is signed by J. C. Bon (chairman), superintendent of reclamation, Wabash; G. W. Lieber, superintendent of reclamation, M-K-T; A. L. Prentice, supervisor of scrap and reclamation, N. Y. C.; W. P. Stewart, superintendent of scrap, I. C.; J. W. Bukey, Foreman reclamation plant, Penna., and L. R. Wink, assistant superintendent, car department, C. & N. W.

Action.—The report was accepted.

New Officers

Owing to the resignation of A. R. Ayers, general manager of the New York, Chicago & St. Louis, as chairman of the Mechanical Division, it became necessary to elect a chairman to serve the remainder of Mr. Ayers' term. On the proposal of the Nominating Committee, O. S. Jackson, general superintendent motive power and machinery, Union Pacific System, was elected chairman, and Silas Zwight, general mechanical superintendent, Northern Pacific, vice-chairman, to replace Mr. Jackson, both to serve until June, 1932. The six members of the general committee whose terms expired were re-elected to serve until June, 1933. These were J. S. Lentz, consulting master car builder, Lehigh Valley; J. A. Power, superintendent motive power and machinery, Southern Pacific, Texas and Louisiana Lines; F. H. Hardin, assistant to president, New York Central; A. G. Trumbull, chief mechanical engineer, Chesapeake & Ohio; G. E. Smart, chief of car equipment, Canadian National, and G. A. Moriarty, general mechanical superintendent, New York, New Haven & Hartford. Mr. Ayers was elected to fill the vacancy created by the election of Mr. Zwight to the position of vice-chairman.

* * *

A single tractor can easily replace the gang and does the work in less time

German Rail Car With Novel Drive

A SERIES of tests has been made in Germany with a unique design of rail car, which has a streamlined body and is powered with a 500-hp. airplane engine installed at the rear of the car driving a four-blade propeller. This car, which is the result of 15 years development and research, has attained a speed of 124 m.p.h. over a straight piece of track, and an estimated speed of 185 m.p.h. is claimed by the designer, Herr Kruckenberg. Tests are being conducted with the cooperation of the German State Railways and the Gesellschaft fur Verkehrstechnik (Association for Traffic Technique). The latter organization is financing Herr Kruckenberg's experiments. It represents a number of industrial and banking interests and was organized with the object of developing rapid, safe and economic means of passenger transportation. The airplane engine, which is installed in the car, was furnished by the German Ministry of Communications.

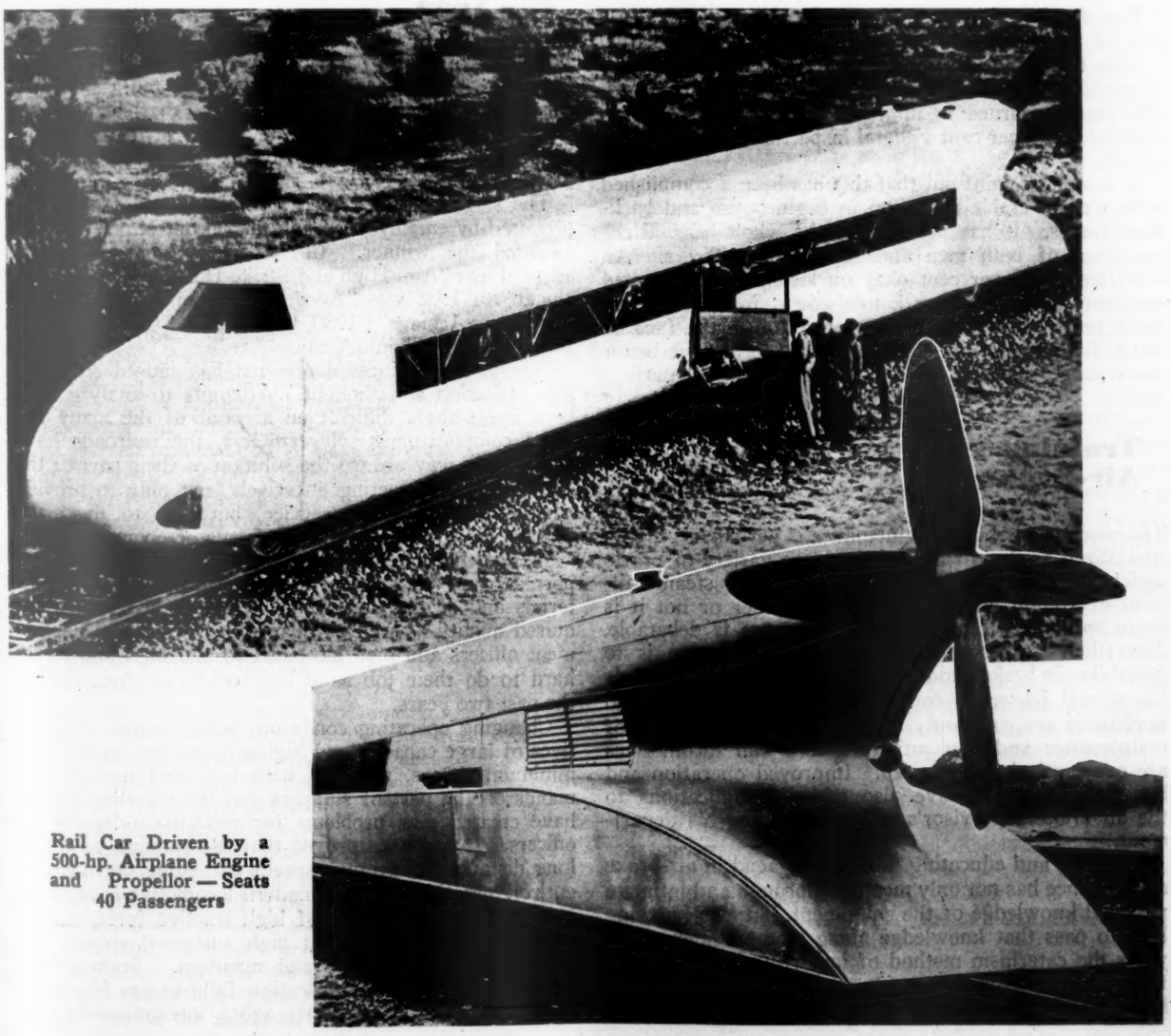
The car weighs 20.6 tons and is built with a streamlined body and is carried on two two-wheel trucks, spaced 65.62 ft center to center. The body is made of steel tubing covered with sheet aluminum and balloon fabric. The operator occupies an elevated compartment at the front end of the car body.

The first tests of the car were made with a capacity load of 40 passengers. The engine is started with the brakes applied. The brakes are released as soon as the speed of the engine has reached the desired number of revolutions per minute.

Engine and Drive

The fuel consumption of the engine is estimated at about 14 gal. of gasoline per 62.2 miles. In addition to the four-blade airplane propeller, the engine drives an air compressor for the brake system and two electric generators which charge the storage batteries. The electrical control equipment and batteries are installed in the front part of the car ahead of the operator's seat. The storage batteries supply current for a motor which furnishes auxiliary power for propelling the car when the airplane engine is idle. The car is equipped with two independent braking devices, viz., an air brake similar to that used on highway vehicles and an emergency hand-brake.

The car also has a baggage compartment and two passenger compartments, one of which is used for smoking. These three compartments occupy a space the length of the car of 52 ft. 6 in.



Rail Car Driven by a 500-hp. Airplane Engine and Propellor — Seats 40 Passengers

EDITORIALS

Ninety-Two Per Cent Locomotives Okay

Shortly after the 1930 convention of the Mechanical Division at Atlantic City, a motive-power officer had occasion to ask one of his enginehouse foremen some questions relative to the final inspection of locomotives outbound from the terminal. The answers given were far from satisfactory. As a result the instructions pertaining to locomotive inspection were reissued and every enginehouse foreman on the system was examined to see that the instructions were thoroughly understood. In addition, the address by A. G. Pack at the final session of the Mechanical Division Convention last year was routed to all enginehouse foremen who were required to initial the copy to show that they had read it.

In 1927, 33.9 per cent of the locomotives inspected by federal inspectors on this railroad were marked defective. This figure was increased in 1928 to 39.2 per cent. In 1929 it was 36.7 per cent. But in 1930 the federal inspectors found only 18.1 per cent defective.

For the first five months of this year only 13.1 per cent of the locomotives inspected were found defective.

June being the last month of the I. C. C. fiscal year, a special effort was made to secure a perfect record. The reports turned in up to the time of this writing indicate a 100-per cent Federal inspection for the 30-day period.

It is well to point out that this has been accomplished with a considerable reduction in enginehouse and backshop forces. It has necessitated the whole-hearted cooperation of both men and supervisory officers. An objective of 92 per cent okay on locomotives inspected has been set up as a mark to shoot at for the ensuing fiscal year. The will to do a better job in the face of many discouragements is the only way to achieve better railroading.

Training The Air-Brake Man

The work of air-brake maintenance is perhaps as highly specialized as that of any of the large variety of crafts which are included in the transportation by steam railroad of freight and passengers. Whether or not it is more specialized than signal maintenance is debatable. Nevertheless, the railroad man whose vocation is to maintain air brakes and see that they function properly has a real job to perform. Air-brake equipment and appliances are constantly improving. New methods of maintenance and application to cars and locomotives are constantly being devised. Improved operation and handling of trains have also added complications to the air-brake supervisor's job of managing his department.

Training and educating the men engaged in air-brake maintenance has not only meant a thorough and intimate personal knowledge of the equipment, but also knowing how to pass that knowledge along to other men. For years the catechism method of imparting instruction to foremen, inspectors, test-rack operators and mechanics has been the generally approved procedure for teaching air brakes. Other methods have been evolved and tried out. But the old question-and-answer system has been found to be the most effective.

At the present time a number of air-brake supervisors and instructors are engaged in revising their instruction books with the object of bringing them up to date. Knowing this, we are publishing, beginning with this issue, a list of questions and answers that have been carefully selected from the air-brake instruction book of an eastern railroad. The work of revising this list was only recently completed. The questions and answers which appear in this issue and which will appear in later issues have been carefully selected with special attention to modern equipment and maintenance practices. Those questions and answers pertaining to federal requirements and those generally accepted as covering established practice have been omitted.

A Slogan For 1932

Each year for the past five years the mechanical department of an eastern railroad has adopted a slogan in the belief, quoting one of its officers, "that slogans promote high ideals and that they are worthwhile. The benefits obtained from our slogans have been innumerable."

The slogan adopted each year is selected from those proposed by employees in an annual contest. A prize is awarded the winner. In 1927, the slogan officially adopted was "Aim High and Strike Hard." The winning slogan for 1928 was "Accuracy and Speed"; for 1929, "Conserve-Achieve"; 1930, "Quality and Quantity," and for this year, "Think-Analyze-Act."

Surely, the business depression has caused considerable reflection and thought. Attempts to analyze have been exceedingly difficult on account of the many unusual complications. Nevertheless, the railroads have gone a long way toward the solution of their part of the problem and are acting effectively, not only to provide efficient transportation service, but also to meet the inroads on earnings from new forms of competition.

In this the mechanical department has played an important part. It has had to conserve in labor and materials and at the same time achieve a task which required quality as well as quantity. Mechanical department officers and men have had to aim high and strike hard to do their job as it has had to be done during the past two years.

Changing operating conditions which require locomotives of large capacity and higher operating speeds with minimum delays, together with new and unusual demands on the part of shippers and the traveling public, have created new problems for mechanical-department officers. It has been proved that the running of trains long distances at average speeds exceeding 60 m.p.h. is entirely practicable. The modern locomotive is not only a transportation machine of high tractive force capable of hauling heavy trains at high sustained speeds, but is economical to operate and maintain. Train delays due to mechanical or lubrication failures are becoming fewer each day. Four years ago a mechanical-depart-

ment officer who had a record of 20,000 freight-car-miles per hot box and one million passenger-car-miles per hot box could feel that his road was getting good results. Today, he is unhappy unless he shows over 50,000 freight-car-miles and over two million passenger-car-miles per hot box.

Engine terminals are organized for the rapid turn-around of locomotives. Back shops are handling class repairs in shorter time and doing a better job. Car inspection and rip-track repairs are being more efficiently handled because of more thorough supervision.

Further reiteration of the accomplishments of the mechanical department is unnecessary for the reader of the *Railway Mechanical Engineer*. Each issue contains plenty of evidence to convince the most skeptical. Considering what has been done and the need to continue our efforts to meet present problems and those which are sure to come up in the near future, we offer a slogan which we believe best describes the ideals for which all mechanical-department men are striving—"EVER BETTER RAILROADING."

A Labor-Saver At Enginehouses

The crane-type truck has demonstrated beyond need of further proof its value as a labor-saver in railway shops and stores departments. It is particularly useful also at engine terminals where the building construction renders crane facilities difficult to install and use effectively, owing to space limitations, obstructing columns, smoke jacks, etc. For handling heavy locomotive parts, either in removal or re-application, the power-operated crane truck is well adapted and proves an important factor in the prompt conditioning of power and reduction of out-of-service time at engine terminals. In fact, it is said that any terminal turning an average of 25 locomotives a day will show good percentage earnings on the investment in a crane truck. The satisfactory performance of the truck depends to a considerable extent on floor conditions, which, however, if unsuited for crane-truck operation, are equally obstructive to hand trucking. In many cases the potential savings from the installation of a crane truck are sufficient to justify not only the investment in the truck but go far toward carrying the investment in new floors and rearrangement of the construction to provide proper clearances.

Among the typical operations in engine-terminal work which can be expedited by the use of crane trucks are the removal and reapplication of air compressors, feedwater heaters, front-end doors, superheater units, locomotive springs, driving-wheel tires, air reverse gears, smoke stacks, main reservoirs, mechanical stokers, piston rods, dome covers, dry pipes, and many other heavy parts. Recently-conducted studies show that one machinist and one helper can remove an air compressor in 1½ hours, using former methods, which depend largely on "main strength and awkwardness", this time being cut to 30 minutes when a crane truck is available. An air reverse gear can be removed by one machinist and one helper in two hours by former methods, as compared with 30 minutes when assisted by a crane truck; a smoke stack can be removed by one machinist and one helper in one hour, as compared with one-half hour with the use of a crane truck.

On the rather infrequent occasions when it is necessary to remove the cab from a locomotive in the enginehouse, this operation can be performed by one machinist and three helpers in eight hours using the old method, as compared with two hours when assisted by a crane truck. The removal of a stoker screw is an awkward operation which formerly required one machinist and one helper two hours. With the assistance of a crane truck and one operator, this work can now be done in 15 minutes. One machinist and one helper formerly took two hours to remove a locomotive piston, this time being cut to 15 minutes with the use of a crane truck. The time required for removing main and side rods depends more or less on the number of pairs of coupled driving wheels, experience showing that if it formerly took one machinist and one helper eight hours to strip the rods on one side of a locomotive, this work can now be done in three hours using a crane truck.

In addition to the operations mentioned, there are many others on which the crane truck can be used to advantage, such as handling various heavy parts from the enginehouse to the back shop, loading and unloading car wheels, etc. The effectiveness of the crane truck is, therefore, not limited to lifting operations, the truck being equally well adapted for carrying heavy materials and operating as a tractor with trailers. The marked flexibility of the crane truck and its ready adaptability to so many different operations tends to reduce idle time to a minimum and cause the truck to more than pay for itself in a short period.

A Profit From the Coach Yard

Many car department supervisors have felt, with some justification in most cases, that when the appropriations for improvements were handed out the car department always came out on the small end of the deal. The result of all this has been that under present conditions it has been difficult to make any kind of a showing toward efficient operation.

Recently, at a staff meeting of passenger-car supervisors on a certain railroad, the question of possible economies in operation was being discussed. All manner of means for cutting expenses were considered, but each time the conclusion was reached that it was not possible further to reduce expenses without affecting seriously the ability of the department to meet the demands of service. A general foreman who had supervision over one of the large coach yards at an important terminal made the rather final statement that he had reached a point where, with the equipment he had, it was with the greatest difficulty that he kept up the service and that the only solution to his problem was the installation of better equipment for handling cars. This general foreman had prepared some preliminary figures to show what could be done with modern equipment at his terminal and he presented data to show that the installation of approximately $30,000 worth of new coach-yard facilities at that one terminal, which handles more than 200 passenger cars and Pullmans each day, would save the company $8,700 a year in maintenance costs. His tentative estimates indicated that the interest on this new equipment, depreciation at 10 per cent (which is far higher than any road charges) and the maintenance costs on the new equipment would run about $5,700 a year leaving a clear profit of about $3,000 a year at this one point.

In almost any business it is not very difficult to find

a reason for buying new equipment which will pay for itself, but when that equipment will actually pay a profit conservatively estimated at 10 per cent on the investment, after fixed charges, the difficulty will be to find an excuse for not buying it.

Safety in Shop Operation

Persistence is an essential gem in the crown of safety. So far as the editor knows, this "gem" of thought has never been expressed in exactly that way before. Whether or not the expression is novel, it is undeniably accurate. At the May meeting of the American Railway Association, Safety Section, in Chicago, C. S. Millard, vice-president and general manager of the Big Four, compared safety work to advertising, since, like most efforts to influence the minds of men, neither has enough momentum to carry on, once the effort is stopped. Advertising experts maintain that the best-known articles of commerce on the market today, sold under the impetus of tremendous advertising campaigns, would shortly disappear from the market if the advertising were discontinued. By the same token, accident-prevention work must be continued with unremitting zeal in spite of opinions sometimes mistakenly advanced that it is "old stuff" and, to a certain extent, non-essential.

The attention given to safety work on the railroads in the past seven years has shown excellent results, including a reduction of 50 per cent in fatal injuries and 35 per cent in non-fatal injuries to passengers per million passenger-miles in 1930, as compared with 1923. As a result of the more intensive training and supervision, the accidents to employees were also greatly reduced, the number killed in 1930 being 52 per cent less than in 1923, and the number injured, 78 per cent less. On the basis of the number of casualties to employees per million man-hours of work, the reduction in 1930 under 1923 is 70 per cent, or twice the goal of 35 per cent which was set. That the intensive efforts of railway shop supervisors have been an important factor in this achievement cannot be successfully denied.

Since persistence is a primary requisite in all safety efforts and since campaigns with definite goals and objectives are a recognized form of safety activities, the following comment by C. G. Sebrell, shop safety supervisor of the Santa Fe, in a recent paper before the Mechanical Division meeting at Chicago, is of interest: "While I have seen good results in accident-prevention work in individual shops, enginehouses and repair tracks, through the aid of campaigns and contests of various kinds, I believe they leave a lasting impression for good only with the exceptional individual; and my observations have taught me that only through education and constant reminders day after day do we accomplish our common objectives."

There is unquestionably much truth in Mr. Sebrell's observations, although the best results are probably obtained when consistent work throughout the year is supplemented by occasional special efforts which serve to give added impetus and renewed interest to this important phase of railroad shop operation.

An additional pertinent suggestion was advanced by Mr. Sebrell which may be summarized in the following: "Shop work is just as safe and efficient as the supervisor demands it shall be, or as dangerous as an inefficient supervisor permits it to be." Regarding discipline, Mr. Sebrell has the following interesting comment to make: "I have no patience with the supervisor who permits rule violations to pass unnoticed and then assesses discipline after the inevitable injury occurs; to me, this seems to discipline a man for the result of his act rather than for the act itself. I do not advocate daily doses of demerit against individual records, but I have known of numberless instances where demerits have made good Indians out of delinquents, which is highly preferable to removing them from service and less costly to all concerned." To illustrate this point, Mr. Sebrell mentioned two cases in which workmen were assessed five demerits each for failure to wear goggles where rules prescribed their use, and, in both cases, within a week each man had one lens broken in his goggle, leaving little doubt that each would have lost an eye were it not for the fact that they were wearing goggles at the time.

The wearing of goggles, the strict observance of the blue-flag rule in connection with car-repair work and insistence on the wearing of shoes with substantial soles are three of the simplest methods of making a substantial reduction in the number of accidents at railway shops, engine terminals, rip tracks, etc., and there should be no let-up in attention to these important details.

NEW BOOKS

THE AIR BRAKE INSPECTOR'S HANDBOOK. *By Carl O. Glenn. Second edition, revised and enlarged, 328 pages, illustrated, 5 in. by 7½ in. Bound in leather. Published by the Simmons-Boardman Publishing Company, 30 Church Street, New York. Price $3.50.*

This, the second edition of the Air Brake Inspector's Handbook, contains material relative to the latest technical improvements in air brakes and describes the most recent developments in air-brake equipment. This edition also includes formulas and tables for air-brake men and supervisors. The author, Carl O. Glenn, was formerly air brake supervisor of the Chicago, Rock Island & Pacific. In the preparation of the new edition he was assisted by John P. Stewart, general supervisor of air brakes of the Missouri Pacific, and a member of the Executive Committee of the Air Brake Association; and by M. S. Belk, general air brake instructor of the Southern, and past-president of the Air Brake Association.

The new edition includes a total of 40 subjects such as Universal Control Valve, P. S. Equipment, M-3 Feed Valves, No. 14 E L Equipment, Air-Hose Coupling Gages, Locomotive Safety Laws and suggestions pertaining to train control.

The first edition which showed methods of testing various equipment for the location of disorders on inbound and outbound locomotives, and in tests; freight car inspection on rip track and in classification yards, and passenger-car inspection in coach yards and terminals, met with a gratifying response. The author, in preparing the second edition has closely followed the objectives which he had in mind in the preparation of the first edition; namely, to furnish experienced air-brake mechanics a book with complete information on the testing of all kinds of air-brake equipment and the location of defects. He has accomplished this in the second edition, and in addition giving valuable information pertaining to the latest developments in air-brake equipment.

THE READER'S PAGE

Why the Chill-Worn Wheel?

TO THE EDITOR:

We read with interest and some dismay, on page 195 of the April, 1931 issue, the letter from General Car Foreman about chill-worn cast-iron wheels, the chief burden of which seemed to be that most of the inspectors do not know a chill-worn wheel when they see one. We change more wheels for this defect than for any other defect on wheels. This being a judgment defect, also one of the most dangerous defects, it is of the greatest importance that it be discovered and removed at the earliest possible moment.

There is no gage to condemn this defect, but there is a gage to condemn a tread-worn-hollow wheel, a defect seldom found. When a wheel is worn in one spot to the extent that it will take the tread-worn-hollow gage, it will be found to be worn through the chill and is much more dangerous than a wheel that is worn to the extent that it will take the tread-worn-hollow gage for three-fourths of its circumference.

Hence we ask, why the chill-worn wheel? Would it not be more consistent to eliminate the chill-worn wheel defect and condemn the wheel for tread worn hollow, avoid guesswork and increase the margin of safety?

W. E. HOGBIN.

The Economics of A Broom

TO THE EDITOR:

"An Economist" writing in the April issue of the *Railway Mechanical Engineer,* page 194, asks "Has any railroad or factory made a detailed study of what constitutes the best broom for factory or shop use?"

Whether the railroads themselves have ever made such a study, there does not seem to be any data available. However, a few years ago one of the old floor sweepers in the shop with which the writer is connected, a modern locomotive repair shop by the way, sent me the following interesting study he had made himself as an entry for a prize that had been offered by the superintendent of the motive power and car departments for the best suggestion submitted by an employee for that year.

The suggestion made in the following letter is exactly as it was received, except that it has been typed, while the original was written on six shim order blanks. Mr. MacDonald was awarded second prize for his suggestion.

M. H. WESTBROOK,
Shop Superintendent, Grand Trunk Western.

Mr. Far:

I can't expect to win your good prize because I am only a laboring man and not a mechanical one, but just the same I want to see the railroad make all it can.

There is too much talk about railroads being managed wrong, and I no this one aint when you offer a $10 prize like you have. My idea is only a broom and I can sweep as good as any man I no. But with a corn broom it works out like this.

I sweep from the vat to the big door in the machine shop behind pit No. 1 in three hours, equaling $1.17. To sweep the same distance with the new kind of heavy broom—5 hours equals $1.95, which it takes. Then you lose 78 cents a day. For the rest of the time I help the machinists.

A corn broom lasts about sixteen days. This, multiplied by 78 cents, is $12.48 you lose on a hard broom and the hard broom does not last as long.

I told my boss about these brooms and he says, do the best you can with them, I do not think they will by any more. Well, that is the best I can what I told you about and also your arms about drop off when you sweep five hours with a hard broom and the corn ones do not tire you at all, but I guess they by them hard brooms cheap and they think they make money, but you see how it is, Mr. Far, don't you?

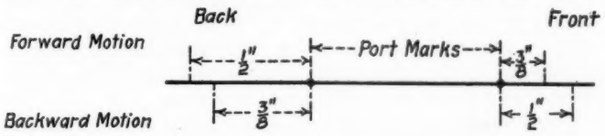
NORMAN MACDONALD.

Setting Southern Valve Gear—An Answer

TO THE EDITOR:

I read in the May, 1931, issue of the *Railway Mechanical Engineer,* an inquiry by Thomas J. Martin, requesting information on how to figure changes in the Southern valve gear. While my experience on this gear has been limited, I believe I can answer Mr. Martin's question satisfactorily.

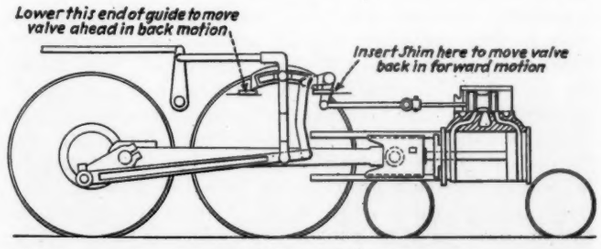
Referring to the specific example of "lame" valve motion which he gives and was reproduced in his letter;



Port openings with the valve rod shortened ⅛ in.

first calculate the average valve-rod error by the same method used to figure the valve-rod error in squaring Baker or Walschaert gears. The differences between the front and back port openings are taken and added together in this case, and the result divided by four to give the average valve-rod error. The valve-road error is ⅛ in. and the valve rod should be shortened. If the valve rod were shortened ⅛ in. the port openings would have the dimensions shown in the sketch.

The front and back motions are now at an equal



Location of snims

amount in opposite directions and the valve rod is the correct length. Any further change would correct one motion at the expense of the other. To correct the error shown it is necessary to place a shim of suitable thickness under the front of the guide, sometimes called the link, and also lower the back end of the link the same amount by removing a shim or reducing it. In this case the shim used should be thick enough to move

the valve $\frac{1}{16}$ in. with the reverse lever set in the same position as when the port openings were marked. Probably about ¼ in. would be required in this case. Raising and lowering opposite ends of the guide or link of a Southern gear has much the same effect as changing the eccentric rod of a Walschaert gear.

It will be noted that an upward movement of the guide will raise the front end of the eccentric rod when the engine is in the forward motion, and acting through the rocker will move the valve back.

H. W. Stowell.

Still Believes Trick Questions Are Useless

To the Editor:

T. J. Lewis disagrees with me, on page 247 of the May, 1931, *Railway Mechanical Engineer* in so far as some of my remarks in connection with car inspectors, outlined in paper presented before the Indianapolis Car Inspection Association, are concerned.

Many of the up-to-date high schools of the country are dropping Latin as a mandatory course. The pupils may take Latin if they desire. It has developed that Latin has been of very little benefit to the students in later years and so nothing is accomplished by its study. The same applies to many of the "discussions" on car-department matters which could just as well be discontinued by the car foreman as could the study of Latin in high schools. I cannot agree that I do not have an understanding of the car inspectors' problems either from a lack of study or of practical experience. I have had quite a number of years in the car department and my remarks were a result of some of the things that I have seen over this period of time.

Intelligent discussions of the A. R. A. Rules are always of benefit, both to the foremen and inspectors as well as to members of A. R. A. billing departments. So far as that is concerned intelligent discussion of any subject is always beneficial to the parties involved.

Let us take the average staff of car inspectors around ordinary terminals. There will be possibly 20 car inspectors on the various shifts. Usually the car foremen hold monthly meetings and the inspectors are invited to present a question for discussion at each meeting. There are 131 rules in the freight code, many of which are blank. There are probably 100 active rules. The invitation to present a question is usually taken as an order by each inspector and as a result 20 questions are presented. If my arithmetic is correct, this is 240 questions a year, and as the majority of questions cover only a few of the rules it can readily be seen that the field for legitimate questions is rapidly covered. And the result is trick questions.

I do not blame the car inspectors for this; it is forced on them and it results in the car inspectors watching for trick problems in their interchange work. "No interpretation of an A. R. A. rule which will delay the movement of a loaded car which is mechanically safe to run is justified." And too many times this happens.

We are continually being told by proponents of the trick question meetings that "many cases are submitted to the Arbitration Committee for decision after the higher railway officers are unable to agree." This is true. But many cases are decided by the Arbitration Committee on direct precedent and the losing road knew that it would lose but took a chance that the Arbitration Committee might reverse itself. Most cases are submitted to arbitration, not because the rules are not clear, but because of the chance that a reversal of a previous opinion might save the road some money.

With reference to the short haul of several different roads which I cited: The inspector cannot help the various interchanges of the car in question but he can assist in expediting the car and aid the traffic department by making sure he does not dig up some technicality whereby he will be responsible for delays to cars in transit.

H. H. Rice.

Adopt Hand Mirrors to Detect Broken Arch Bars

To the Editor:

I read with a great deal of interest in the March issue some remarks regarding the use of a special mirror for car inspectors to aid them in discovering cracked or broken arch bars. This instrument is very valuable in assisting a car inspector to locate broken or cracked arch bars, and I wonder why some railroads have not yet adopted it. The importance of detecting broken or cracked arch bars cannot be over-emphasized. I have known of several instances in which serious damage and loss has resulted on account of a broken arch bar.

From August 1, 1929, to March 31, 1931 (20 months), 1,603 broken or cracked arch bars were discovered by the third shift inspectors at a terminal on a southeastern railroad by use of carbide lights and mirrors. It, therefore, seems to me that all railroads should use the mirror in handling such an important task, thereby reducing to a minimum the loss and damage that frequently occurs.

A. L. Dillon.

Follow Instructions According to Rule 66

To the Editor:

Of late one reads quite a lot about hot boxes and how to eliminate them. Every car man knows that our superior officers will be right after us on the wire wanting to know why, when a car is set out on their lines. One car inspector will say "waste grab," another "a broken brass," etc. But when the car is set out and the inspector gets to it, of course it has a broken brass and not enough sponging. Whether or not the inspector's report shows the real cause of the hot box is just a guess.

Of course, he has to say something, and naturally he is going to say the first thing that enters his mind—what we might consider as passing the buck. However, when a car is set out for a hot box all we can do is to fix it and get it moving. To eliminate these hot boxes we should be more careful with our cars and be more particular in complying with Rule 66.

If each car were repacked, each box raised and the wedges and bearings examined, new ones being applied when needed, and packed according to the rule as illustrated at the top of page 92 of the rule book, there would be less talk about hot boxes. The majority of hot boxes occur on cars that are not repacked when they should be.

When a man gets an automobile he oils and greases it approximately every five hundred miles. One seldom sees an automobile set out with "hot boxes."

F. T. Jones.

With the

Car Foremen and Inspectors

Three Milwaukee Car-Shop Devices

THREE labor-saving devices now being used in the Chicago, Milwaukee, St. Paul & Pacific car shops at Milwaukee, Wis., with unusually good results, include an air-hose bundler, an angle-cock grinding machine and an air-brake repairman's truck, illustrated.

Referring to the first of these devices, it may be said that it facilitates handling one of the many awkward materials which must be taken care of by car men, as well as stores department forces; namely, scrap air-brake hose. It is not a difficult job to handle a few scrap hose, but in any large shop or repair point where vast numbers of air-brake hose must be stripped, the scrap hose assembled, moved to the stores department, counted and shipped to the scrap dealer, the total amount of labor involved in re-handling individual hose reaches a very large total.

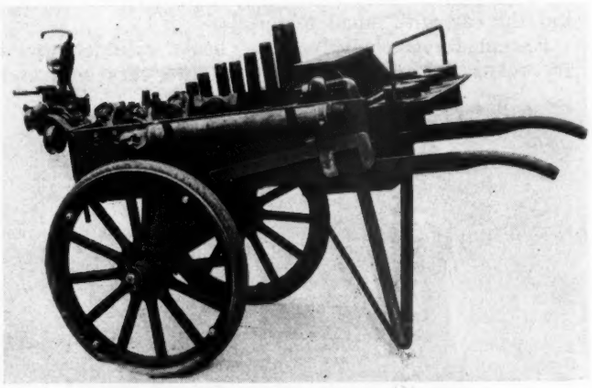
The machine, illustrated, consists simply of a 10-in. air-brake cylinder and frame arrangement, whereby the hose are assembled in a rack secured to the air-brake cylinder piston and, when 35 of these hose are collected, operation of the air brake piston and rod forces the hose up against a stop (not shown) in the top of the machine. While the hose are in this compressed condition, a single wire is securely fastened about the center of the hose. Release of the air pressure in the brake cylinder permits the resulting compact bundle of hose to drop and be readily placed on a wheelbarrow or truck for handling to the stores department.

This hose-bundling machine is mounted on truck wheels of small diameter so that it can be readily moved to whatever position, adjacent to the hose-stripping machine, is most convenient. No more work is required to place the stripped hose in the rack of the machine than to throw them in a wheelbarrow or truck. Subsequent handling to the stores department and loading on cars for delivery to the scrap dealer are greatly facilitated, as well as the counting of the hose, since they are all tied in compact bundles of 35 each.

Angle-Cock Grinder

The four-spindle angle-cock grinding machine is constructed as shown in the illustration and promises to be an effective labor-saving device in connection with the grinding of angle cocks and cut-out cocks of all kinds, conditioning them for further service.

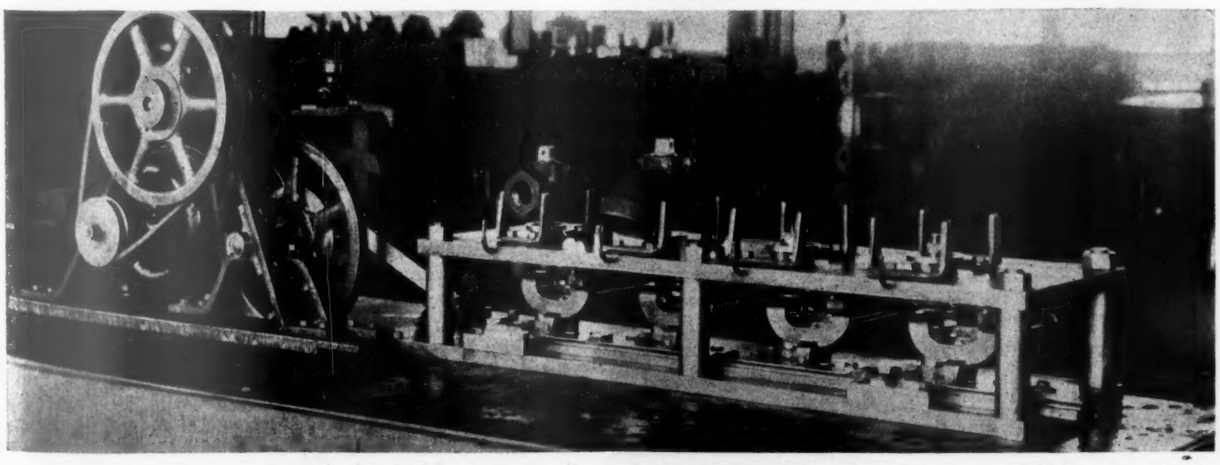
The machine is mounted on a bench, the top of which consists of a ½-in. steel plate comprising the base of the



Side view of fully-equipped air-brake repairman's truck which operates on rubber-tired roller-bearing wheels

machine. Driving power is furnished by a small electric motor and V-belt reduction drive to an eccentric and a reciprocating bar, equipped with a rack which revolves the individual spindles through small pinions. The design of machine includes a cam-operated "kick-off" feature which operates after each double revolution to promote a more uniform distribution of lubricant and abrasive on the surfaces to be ground.

In accordance with the usual practice, the angle cock



Four-spindle angle-cock grinding machine recently built at the Milwaukee shops of the C. M. St. P. & P.

plug or key is screwed on the upper end of the spindle, the body being prevented from revolving by suitable stops which are designed to accommodate different sizes of angle and cut-out cocks. Suitable gaskets are provided to keep the excess lubricant and abrasive from following the spindle down and cutting out the bearings of the machine.

Two men are required to keep this machine busy and, when in full operation, an output of 90 angle cocks in eight hours is secured.

Air-Brake Repairman's Truck

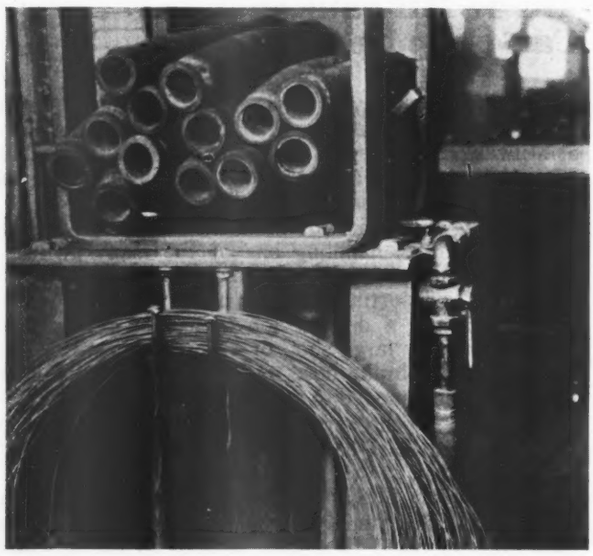
A convenient and completely-equipped air-brake repairman's truck which has been standardized for use at car-repair points on the Milwaukee is clearly shown in the illustrations. This truck, equipped with rubber-tired, roller-bearing wheels, is used at repair tracks on the system, the idea being to provide an easy means of conveying all tools, testing equipment and small materials directly to the car and thus avoid the necessity of car-repair men making frequent trips between the shop and the car with small materials.

Except for triple valves and brake cylinders, which are relatively heavy and delivered to cars separately,

View showing the convenient arrangement of all necessary small supplies—Single car-testing device permanently mounted on the truck end

this truck carries all necessary supplies, including pipe nipples of several sizes required, a number of angle cocks and cut-out cocks, retaining valves, release valves, air hose, etc. In the body of the truck is a box divided into compartments in which are carried pipe-fittings, cotter keys, gaskets, etc. Just forward of this box is the seat box, used by the man when cleaning an air-brake cylinder under a car. This box has two compartments which are used for waste and tools necessary to cylinder cleaning and changing triple valves. On the side of the box, loops are provided for brushes used in the application of kerosene, black paint, white lead and lubricants, which are carried in four individual cans ingeniously held in a special carrier equipped with a handle. This carrier is so designed that it will stand alone on the ground. The truck also carries a die starter and wrench, as well as solid dies for cutting train-line pipe threads. Pipe wrenches, also a ram rod for cleaning the pipe in the auxiliary reservoir, are provided.

The single-car testing device is made a permanent part of the truck so as to avoid injury to it by possible dragging on the ground. A combined leakage-testing



Partial view of air-hose bundling machine which presses 35 scrap hose upward against a stop (not shown) for wiring in a compact bundle

device is carried immediately behind the single-car testing device. Two sheet-iron waterproof receptacles under the front of the truck contain space for gaskets and packing leathers, as well as billing repair forms No. 617.

This truck and its equipment permit the air-brake man to perform any repairs to air-brake equipment on any freight car, except renewing brake cylinders and reservoirs, without going back to the shop. An inventory of the material in the truck before and after making repairs to the air-brake equipment of a car affords a record of material used.

Questions and Answers For Air Brake Foremen

THE development of improved features in air-brake equipment, together with the fact that many changes in maintenance and operating practices have been made in recent years has required the heads of air-brake departments of a number of railroads to take up the task of revising their examination questions and answers for air-brake foremen, machinists and inspectors. The following questions and answers have been selected from the instruction pamphlet of an eastern road. This pamphlet is still in the process of preparation and only certain sections have been issued in mimeographed form. Following is the first group of questions and answers which have been selected as being of special interest. Others will appear in subsequent issues of the *Railway Mechanical Engineer*.

Q.—At what speed should (a) a 150-ft. compressor, (b) a

120-ft. compressor, (c) a 9½-in. compressor maintain 60 lb. main-reservoir pressure against standard orifice? A.—(a and b) 95 strokes per minute. (c) 115 single strokes per minute.

Q.—What should be done if these speeds have to be exceeded to maintain 60 lb? A.—Arrangements made for removal before the compressor fails in service.

Q.—What size orifice is used to test 9½-in. compressors, 8½-in. cross-compound 120-ft. compressors and cross compound 150-ft. compressors? A.—9½-in. compressors, 11/64-in. orifice; compound 120-ft. compressors 15/64-in. orifice; compound 150-ft. compressors, 9/32-in. orifice.

Q.—In case a compressor cannot maintain 60 lb. main-reservoir pressure at the required speed what must be done with the compressor? A.—It must be condemned and sent to the shop for repairs, except when it is known that rings are defective, in which case the rings may be renewed.

Q.—Before making an orifice test what should be done? A.—It should be noted that : (1) proper main-reservoir pressure is secured; (2) that the compressor strokes are uniform; (3) compressor is not pounding; (4) air strainer is clean and in good condition; (5) piston-rod packing is free from leakage; (6) the steam end, including the steam cylinder, valve chamber, etc. is not blowing; (7) the compressor and its (8) pipe connections are free from leakage; (9) drain cocks are operative, and (10) that the necessary lubricating attachments are provided and are in good condition.

Q.—Explain in detail how an orifice test should be made? A.—(1) Place automatic brake valve in lap position. (2) Close distributing-valve supply-pipe cut-out cock; (3) Apply test fitting with proper orifice disc for the compressor to be tested in the main-reservoir drain cock. (4) Charge main reservoir to 60 lb. (5) Regulate the speed of the compressor with the steam throttle until pressure remains constant at 60 lb. with main reservoir cut-out cock in open position, then count the single strokes of the compressor per minute.

Q.—How often should the air passages of air compressors be laundered? A.—As often as conditions require.

Q.—When should this work be performed? A.—At the time the compressor receives orifice tests or whenever compressors are reported as going lame.

Q.—At what speed should a pump be run and at what temperature should the laundering solution be kept? A.—The compressor should be run at low speed with the laundering solution kept boiling hot.

Q.—How long should the solution be run through the pump? A.—Not less than one-half hour, or as much longer as the condition of pump requires.

Q.—After laundering a compressor what is of utmost importance? A.—The working of clear hot water through the air cylinders until the water is discharged from the cylinders uncolored.

Q.—How and when should air compressor strainers be cleaned? A.—They should be dismantled, hair removed, when used, thoroughly cleaned and replaced when the compressors are laundered.

Q.—Should an orifice test be made before or after laundering? A.—It may be either before or after.

Q.—What is the proper piston travel for driver brakes on engines equipped with A-1 equipment or combined straight air and automatic equipment? A.—It should be such as to develop about 50 lb. brake-cylinder pressure from a brake-pipe reduction of 20 lb. with an initial brake-pipe pressure of 70 lb.

Q.—What should be noted with respect to leakage at the exhaust ports of brake valves, triple valves, distributing or control valves, brake-pipe vent valves and electric compressor governor? A.—That there is no leakage at the exhaust ports.

Q.—What may cause excessively high main-reservoir pressure to be registered on the gage? A.—Defective or improperly adjusted compressor governor or the air gage may be defective.

Q.—What may cause excessively low main-reservoir pressure to be registered on the gage? A.—Low compressor speed, defective or improperly adjusted compressor governor or a defective air gage.

Q.—What may cause low equalizing-reservoir or brake-pipe pressures to be registered on the gage. A.—Defective air gage or gages, low main reservoir pressure, a defective or improperly adjusted feed valve, or a leak of main reservoir air into the brake pipe.

Q.—At what points might main-reservoir air leak into the brake pipe? A.—(1) Automatic rotary valve. (2) Middle gaskets of six-position brake valves. (3) Lower gaskets of five-position brake valve. (4) Defective feed valve or distributing valve gaskets.

Q.—Explain how to test for a leaking automatic-brake-valve rotary? A.—Deplete brake-pipe pressure to zero, close double-heading cut-out cock and place brake valve in lap position. A leaking rotary may cause discharge of air at service exhaust.

Q.—What may cause a leak or blow at the emergency exhaust port of automatic brake valves No. 5 and 6 ET, or 12 and 14 EL equipment, brake valve in running position? A.—Defective automatic rotary valve or seat, middle or lower gaskets; independent brake-valve rotary valve or seat or lower gasket. Distributing-valve equalizing slide valve or seat, distributing-valve gasket or top gasket of brake valves in EL equipment.

Q.—What may cause a blow or leak from the automatic-brake-valve emergency exhaust port No. 6 ET equipment (U pipe removed)? A.—A defective automatic brake valve rotary or seat.

Q.—What may cause a leak or blow at the independent brake valve (U pipe connection with pipe removed)? A.—Defective independent brake-valve rotary valve, or seat or lower gasket; defective automatic rotary valve or seat; middle or lower gasket; distributing-valve equalizing slide valve, or seat or distributing valve gasket.

Q.—Explain how source of leakage referred to in previous question is determined? A.—Lap automatic brake valve and note pressure registered on brake-cylinder gage. If pressure does not exceed 45 lb. it indicates a defective independent brake valve. If pressure exceeds 45 lb., disconnect application cylinder and distributing-valve release pipes and note whether air comes from the distributing valve or pipe. If the U pipe is removed, lap the independent brake valve instead of the automatic.

Q.—What may cause leakage at the emergency exhaust of a G-6 brake valve in running position? A.—A defective rotary valve or seat.

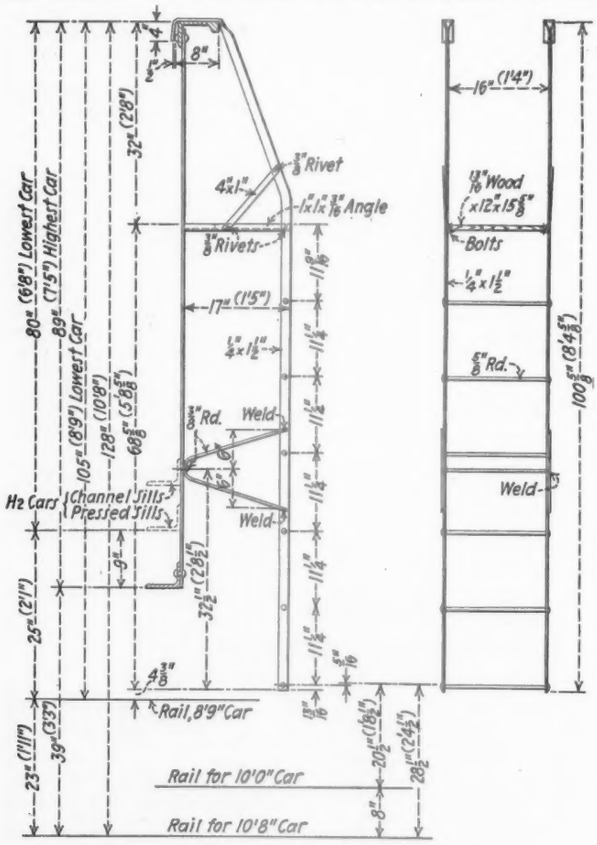
Safety Ladder For Open-Top Cars

THE safety ladder shown in the two illustrations was designed by Guy M. Gray, superintendent of motive power, Bessemer & Lake Erie, to reduce the hazard for men engaged in trimming or in loosening coal, ore, slag, etc., in open-top cars so that the lading will fall through the hopper doors. There is always the possibility for a man engaged in such work of falling off or into the car, or being buried under a slide.

The ladder is easy to handle, weighing but 42 lb. It can be slung over the side of a car at any location along

This ladder ensures safety to the workman trimming cars at coal tipples

the sides or ends. The stiles of the ladder are ¼-in. by 1½-in. bar stock. The rungs are made from ⅝-in. round bar. They are secured to the stiles by heading over each end of the rung with a rivet hammer. The ends of the ⅝-in. bar are turned down to ⅜ in. diameter and inserted in $\frac{7}{16}$-in. holes in the stiles spaced 11¼ in.



Safety ladder used on the Bessemer

apart. The ladder is held straight against the side of the car by the step and bracket support, as shown.

Decisions of Arbitration Cases

(The Arbitration Committee of the A.R.A. Mechanical Division is called upon to render decisions on a large number of questions and controversies which are submitted from time to time. As these matters are of interest not only to railroad officers but also to car inspectors and others, the Railway Mechanical Engineer will print abstracts of decisions as rendered.)

Tank-Head Damage Caused by Previous Fracture

On March 19, 1929, the tank head at the B end of the Union Tank Line Company's car 49210 was broken while being switched on the Michigan Central at Detroit, Mich. The fracture of the tank head was 56 in. in length and opened outward. The car owner stated that the car had been in service five years without the renewal of the tank head in question, and that nine months prior to the accident the tank had been properly tested by the application of 60 lbs. hydrostatic pressure without any distress. The owner contended that this test proved that the car was in safe condition for ordinary handling and maintained that since the tank head burst it was the result of improper handling The Michigan Central produced a section of the tank head showing that an old defect had existed in the head and that it was directly responsible for the final failure.

In rendering its decision the Arbitration Committee stated: "The final failure of this tank head developed from a previous fracture in same. Car owner is responsible."—*Case No. 1661—Union Tank Car Company vs. Michigan Central.*

Renewal of Auxiliary Gasket Within Air-Brake Cleaning Date

On October 10, 1928, the Great Northern cleaned the air brakes on Union Pacific car 72123 on account of a worn-out auxiliary gasket. The brakes had been cleaned 113 days prior to the renewal of the gasket by the Great Northern. The U. P. contended that the principle of Interpretation 2, of Rule 60 indicates that if a definite defective condition can be corrected by the renewal of a defective auxiliary gasket, the renewal of this gasket does not in itself warrant the attention specified for cars requiring annual repairs of air brakes. The Great Northern did not deny that the air brakes were cleaned solely on account of the auxiliary gasket, but contended that Interpretation 2 of Rule 60 would specifically mention this gasket if it was the intent of the rules that the renewal of a defective cylinder gasket in itself does not justify the attention specified for cars requiring annual repairs within nine months.

Following is the decision as rendered by the Arbitration Committee: "The contention of the Union Pacific is sustained."—*Case No. 1662—Union Pacific vs. Great Northern.*

Betterment Charge For Loose Wheels Removed By Owner

The Pacific Fruit Express Company presented a joint evidence statement dated September 12, 1929, for one loose wheel on its car 36562, the wheels having previously been applied by the Chicago, Burlington & Quincy on January 30, 1929. The C. B. & Q. issued a defect card under its understanding of the provisions of Rule 81 as modified in Supplement No. 1 to the 1929 Code and marked it "Labor only." The owner protested the wording of the defect card at the time it was received from the C. B. & Q., claiming that the words "Labor only" should not have been written on it. There was no claim that the wheel in question was defective or to be scrapped for any cause. The owner contended that it was entitled to material as well as labor, namely, the difference in value between new wheels applied and secondhand wheels removed. The C. B. & Q. questioned the charge for new less secondhand wheels, inasmuch as the wheels removed from the owner's car, and replaced by new wheels, were secondhand wheels. The labor charges for changing the wheels was not disputed.

The decision as rendered by the Arbitration Committee is as follows: "The defect card cannot be restricted to cover labor only, in view of the principle of Rule 65. In this connection, however, where repairs are made by the car owner on authority of defect card, no charge shall be made for the difference in value be-

tween new wheels applied and secondhand wheels removed, in view of the principle of Rule 98, Section (b), Paragraph (7)."—*Case No. 1663—Chicago, Burlington & Quincy vs. Pacific Fruit Express Company.*

Car Reported Damaged Under Rule 120——Date Correct

On June 22, 1928, the Chicago, Milwaukee, St. Paul & Pacific flat car 68087 failed in ordinary handling while being moved in Missouri-Kansas-Texas train No. 72 at Paola, Kansas. On June 30, 1928, the car was reported to the owners under A.R.A. Rule 120 at which time they were furnished a joint inspection certificate showing the defects existing on the car as well as the circumstances under which the failure of the car developed. On July 5, 1928, the owners requested further information as to how the damage developed and, at the same time, called attention to the fact that the report furnished by the M-K-T on June 30, referred to A.R.A. Rule 112 as well as A.R.A. Rules 120 and 44. In reply the M-K-T advised the owners that the reference to A.R.A. Rule 112 in the original report of June 30, was the result of a typographical error and should have read Rule 120. On July 26, 1928, the owner authorized the dismantling of the car at their expense. This was done and the owner was authorized to render a bill against the M-K-T to cover the value of the salvage recovered. However, the question as to the date that per diem should cease was not settled. The C.M. St. P.&P. contended that per diem should not cease until July 10, 1928, contending that the information furnished in the M-K-T letter of June 30, was not sufficient to enable them to determine responsibility for the damage. It was contended by the M-K-T that per diem should cease June 30, 1928.

The decision as rendered by the Arbitration Committee follows: "The circumstances covering failure of this car as contained in report of handling line dated June 30, 1928, were sufficient to establish the responsibility of car owner in accordance with Rules 44 and 120, notwithstanding unintentional reference to Rule 112 in same letter. Therefore, the car was correctly reported under Rule 120 as of June 30, 1928".—*Case No. 1665—Chicago, Milwaukee, St. Paul & Pacific vs. Missouri-Kansas-Texas.*

Defective Card Claimed To Be Issued Improperly

On October 16, 1929, the Empire Oil & Refining Company's tank car No. 667, arrived at the Cushing, Okla., plant of the owners carrying a defect card issued by the Pueblo Joint Interchange Bureau against the Denver & Rio Grande Western covering: One tank head bent in, one buffer block bent and broken, two center sills bent, one hand rail bent, one tank band anchor-casting wheel cut, one tank band-wheel cut, one center-sill bottom cover plate bent up, and auxiliary-reservoir bracket bent; all on account derailment. At the request of the owner and before responsibility for the damage was agreed upon, the car was billed home for repairs. Repairs were made by the car owner and the bill in the amount of $264.24 was rendered against the D. & R. G. W. on the authority of the defect card issued at Pueblo. The tank car was damaged when the brakes on the train in which the tank car was moving went into emergency as a result of couplers passing between the second head-end engine and the first car of the train. The damaged car ERIX 667 was the forty-eighth car from the head end. The impact broke the adjacent couplers on car ERIX 667 and the New York Central car 342091, leaving no protection between the two cars, since the end sill on the N.Y.C. car was almost flush with the end of the car and ERIX car 667 had no end sill. The trucks were driven under the ERIX car and the end of the car sagged downward and outward coming in contact with the metal end sill of the N.Y.C. car causing the above damage. The handling line stated that no cars were derailed or telescoped but all damage was the result of the emergency application of the brakes. For this reason the D. & R. G. W. contended that the damage was the owner's responsibility, that the defect card granted by the Chief Joint Interchange inspector at Pueblo was issued in error because he was not in possession of the facts as to the manner in which the car was damaged, and that the car was not damaged or derailed or subjected to other unfair usage that might be considered handling line responsibility under A.R.A. Rule 32. For these reasons the handling line declined to pay the bill rendered on the authority of the defect card.

In rendering its decision the Arbitration Committee stated: "The issuance of a defect card by an authorized representative of a railroad is an acknowledgment of responsibility by the company issuing same which cannot be repudiated and leaves no grounds for arbitration by this Committee. The principles of Decisions 1235, 1373, 1398, 1472, 1571 and 1655 apply".—*Case No. 1664—Empire Oil & Refining Company vs. Denver & Rio Grande Western.*

Noiseless Truck for Icing Passenger Cars

TO eliminate complaints against the noise made by car men while icing passenger cars due to the rumbling of the wheels of the conventional baggage trucks in and about passenger stations a progressive passenger-car foreman designed the icing truck shown in the illustration.

Four solid-tired automobile wheels on roller bearings make this icing truck noiseless and easy to handle

Two front axles and four front wheels of the Ford car type equipped with solid rubber tires are easily obtainable from any automobile scrap yard and in many instances can be secured from the scrap pile in the railroad yard. By connecting the spindles of the front wheels to the spindle of the opposite wheel on the rear

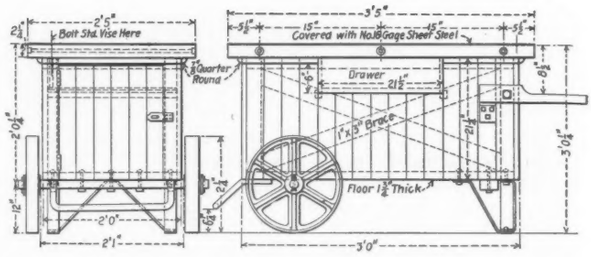
of the truck it can be made to turn in a comparatively small space. Roller bearings make it possible for one man to handle the truck with ease.

The body, if electrically welded, can be made leak-proof. A wooden slat bottom will keep the ice from contact with the water in the bottom of the truck. For sanitary reasons the slat bottom should be removable. A ⅜-in. drain cock, located in the bottom of the body, at the rear, will permit the draining of water when desired.

The truck shown in the illustration has been equipped with a brake. The brake is attached to the tongue and becomes effective as soon as the tongue is raised. The brake is then effective as long as the tongue is hooked up and eliminates the necessity of chocking the wheels when the truck is left on grades or inclines.

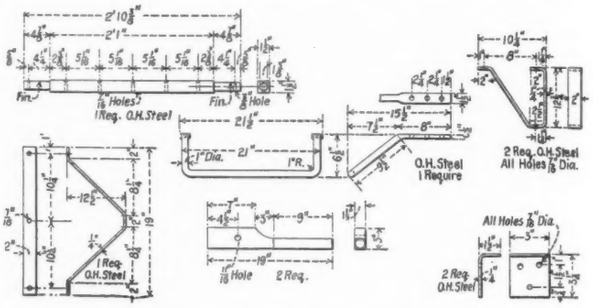
Portable Work Bench For the Car Department

CARPENTERS, pipe fitters and other craftsmen employed in making repairs to coaches and box cars frequently have to work in various parts of the shop and require a considerable number of tools and a bench on which to work. The portable bench shown in the two drawings was designed to meet such requirements. It is carried on two 24-in. cast-iron wheels. Legs of forged steel are provided at the rear end. The top is covered with No. 16 gage sheet steel. Bolt holes are provided near the rear end of the bench for a vise.



Portable work bench for the coach and box-car repair shops

A drawer 6 in. deep by 21½ in. wide is provided for small tools and equipment. The remaining space underneath the bench is enclosed and used for a locker.



Details of the portable work bench

The door to the locker is located at the front end as shown, and is provided with a hasp for a padlock.

* * *

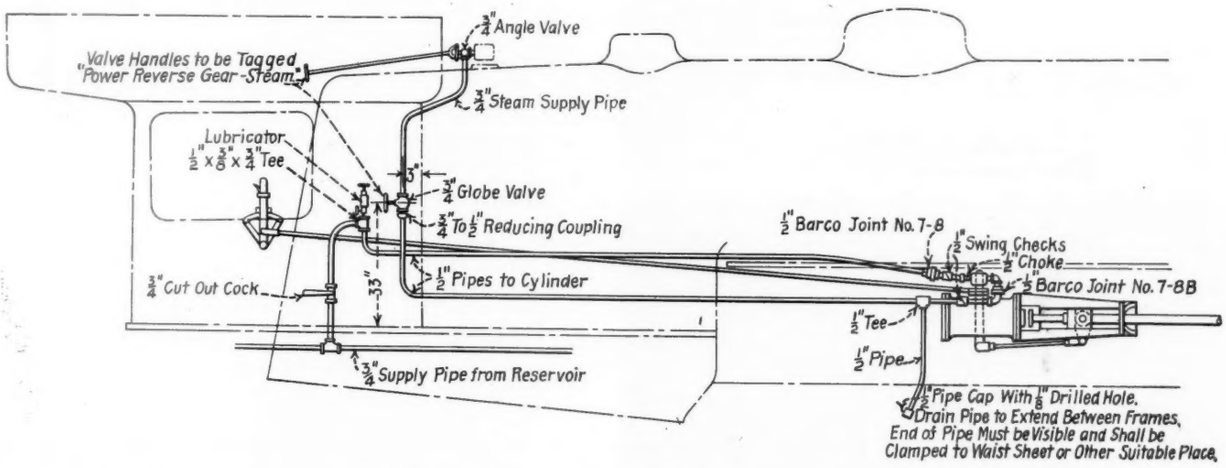
An ultra-modern passenger car as advertised in the *American Railroad Journal* in 1855

In the Back Shop and Enginehouse

Piping Locomotives For Power-Reverse Gears

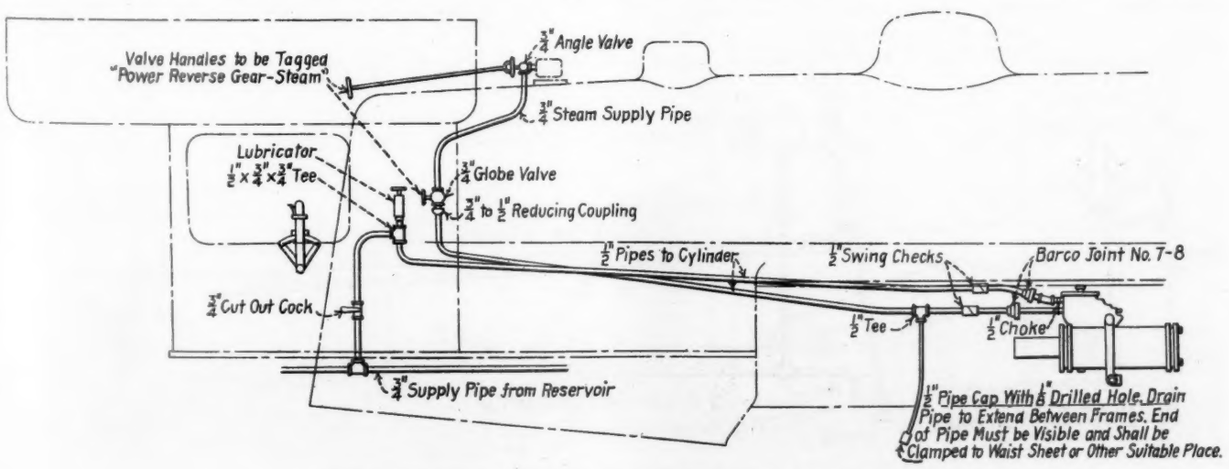
THE piping diagrams for the various types of power-reverse gears shown in the drawing have been followed for a number of years by an eastern railroad in the application of gears to its locomotives. The principal feature of these piping applications is safety. It is possible, with this arrangement of piping, to operate the gear by air or steam, although on this road all gears are applied for air operation. However, in case the air line is broken or becomes inoperative, the engineman can, by manipulating several valves, change the gear to steam operation. The general scheme of piping arrangement is applicable to all power-reverse gears in addition to those shown in the four drawings showing the piping diagrams.

Referring to the piping diagram of the Barco Type B-3 power-reverse gear, the engineman closes the ¾-in. cut-out cock in the air supply pipe and opens the ¾-in. angle valve at the steam turret by turning the extension-valve handle in the cab. He also opens the ¾-in. globe valve, which is located further down the side of the boiler in the cab. Both of these steam valves are tagged "power-reverse gear-steam". Directly connected to the ¾-in. globe valve in the steam line, through a ¾-in. to ½-in. reducing coupling, is a ½-in. supply pipe to the cylinder of the power-reverse gear. A ½-in. drain pipe is connected to the steam line as shown in the drawing.



Piping diagram for the Alco Type E power-reverse gear

A ½-in. choke, shown in one of the drawings, is inserted in the air line to the cylinder of the power-reverse gear. This choke permits adequate building up of the steam pressure in the valve chamber when the gear is being operated by steam and the compressed air is shut off. The two drawings showing the choke also show the steam- and air-inlet connections to the cylin-



Piping diagram for the Barco Type B-3 power-reverse gear

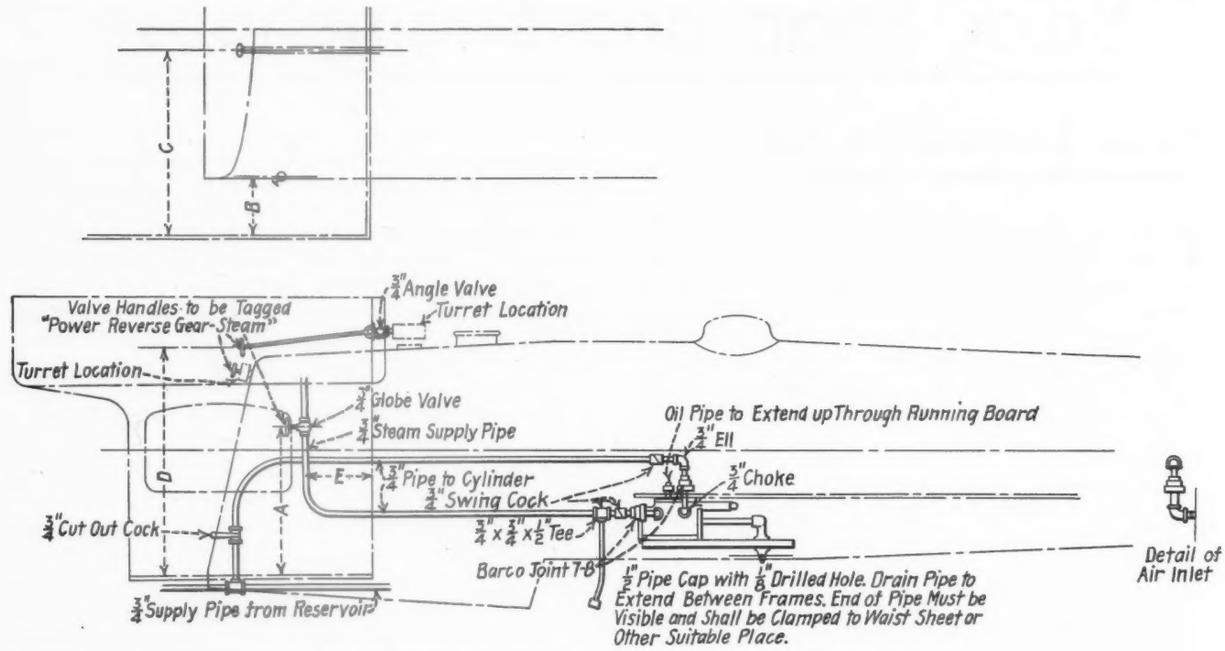
der of the reverse gear and the location of the choke nipple.

The piping diagram for the Barco Type B-4 power-reverse gear is similar to that of the Type B-3. However, ¾-in. steam- and air-line connections are used which eliminates, of course, the ¾-in. to ½-in. reducing coupling at the globe valve in the cab.

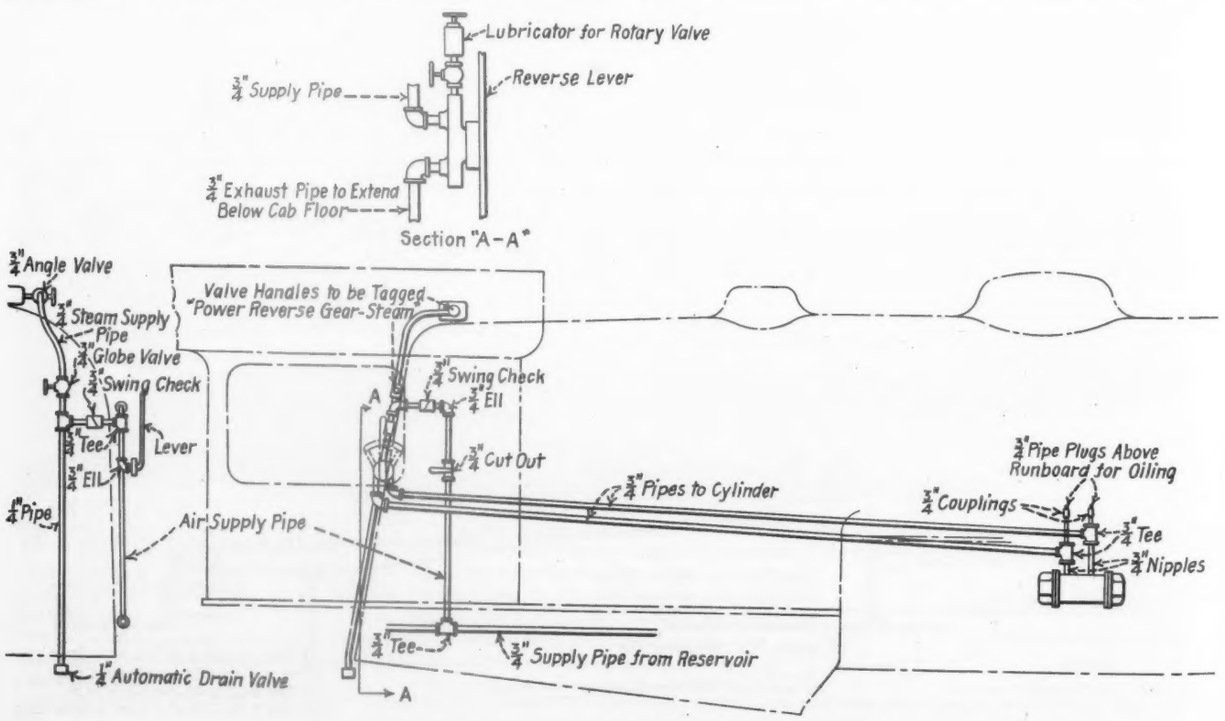
One-half-inch steam and air lines are used in the installation of the Alco Type E power-reverse gear. Swing checks are inserted in both the steam and air lines for the application of the Alco gear as in the Barco installation just described.

The Ragonnet Type A piping application diagram calls for ¾-in. steam and air lines while the Type B has ½ in. The oil pipes to the cylinder, in the case of power-reverse gears which are applied to the side of the boiler, extend up through the running board.

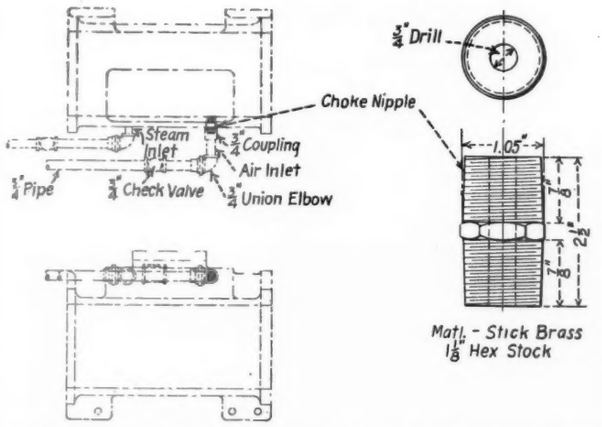
The piping diagram for the Lewis power-reverse gear calls for ¾-in. steam and air lines. The swing check is inserted in the connection between the steam



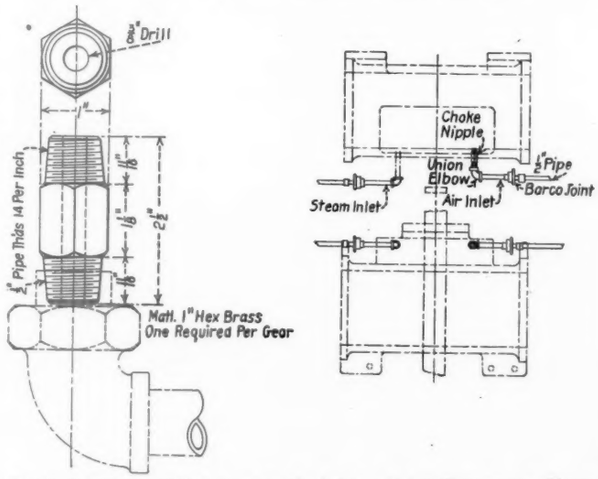
Piping diagram for the Ragonnet Type A power-reverse gear



Piping diagram for the Lewis power-reverse gear



Choke nipple applied in the air inlet of the Ragonnet Type A and the Barco Type B-4 power-reverse gears



Choke nipple applied in the air inlet of the Ragonnet Type B; Alco Type E and Barco Type B-3 reverse gears

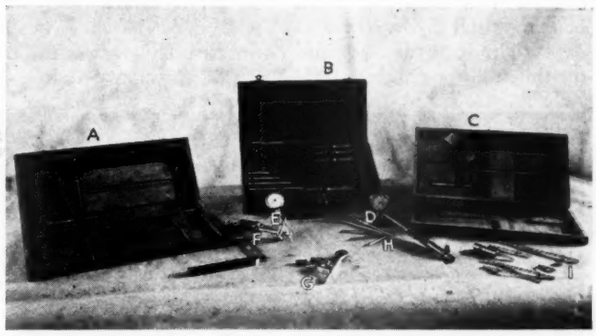
and air lines. A choke nipple is not reqired in this application on account of the small size of the cylinder, 8 in. by 18 in. All pipes and fittings used in this application are extra heavy.

Precision Tools Required In Rail-Car Maintenance

By E. O. Whitfield

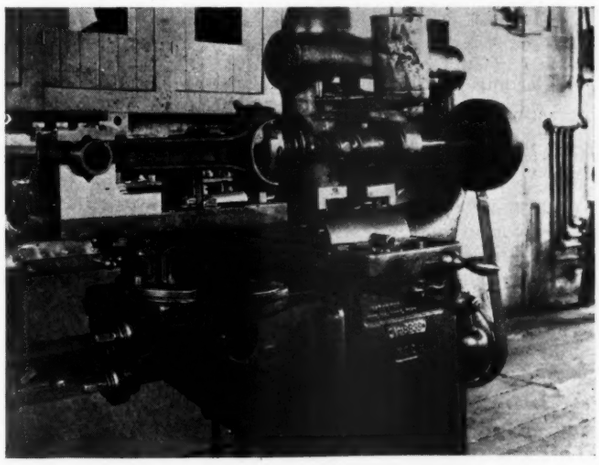
GOOD precision tools, such as micrometers, gages, indicators, special fixtures, etc., are essential to efficient rail-motor-car maintenance. Of greater necessity is having the men expert in the use of precision tools and proficient in work which requires a high degree of accuracy.

The operation shown on the milling machine is that of facing off a connecting-rod shell. The connecting rod is held in position with a fixture which consists essentially



Precision tools used in the general overhaul of rail-motor cars

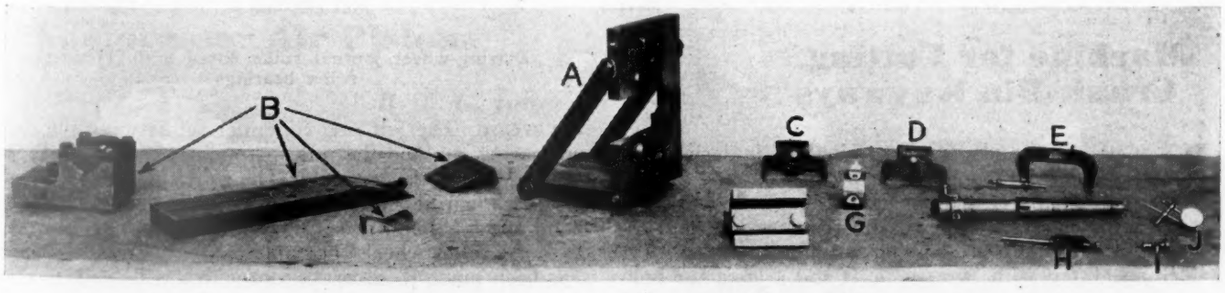
of a V-block and clamp. The boring operation is also handled on this machine, but with a different cutter. Accurcy is possible with this fixture and is a considerable time saver as compared with scraping by hand. The fix-



Facing off a connecting-rod shell on a milling machine

tures and cutters were made in the tool room of the locomotive repair shop.

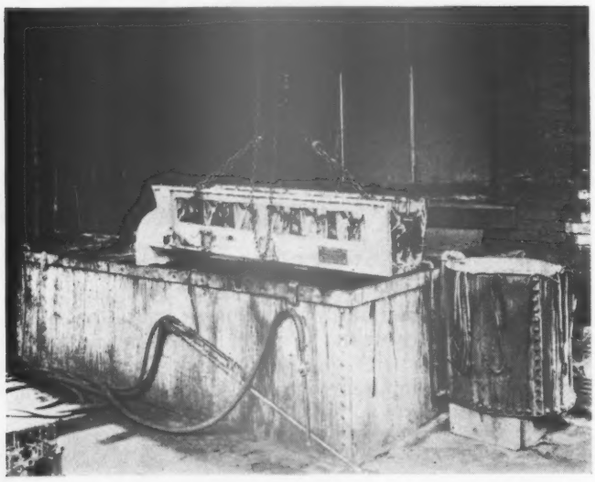
The detail parts of this fixture are shown in another illustration, and also the tools used for boring and facin connecting rods. *A* is the rod- and cap-facing fixture; *B*, rod-boring fixture; *C* and *D*, clamps for hold-



Detail parts of the fixture for facing off connecting-rod shells

ing the cap in the fixture; *E*, 4-in. outside micrometer; *F*, arbor and adjustable-boring cutter; *G*, adjustable boring cutter for small connecting-rod ends; H, indicator attaching clamp; *I*, indicator flexible attachment and *J*, an indicator. These fixtures and tools are used for truing connecting rods and cap faces, as well as for boring bearings and rods.

The fixture *A*, which is shown on the milling machine, is used with the cutter *F* shown for facing the main-rod bearing shell down to within the desired distance of the caps. The fixtures *B*, *C* and *D* are also shown assembled on the milling machine. The shells are clamped in po-



Cleaning tank where all parts are thoroughly cleaned before going into the shop

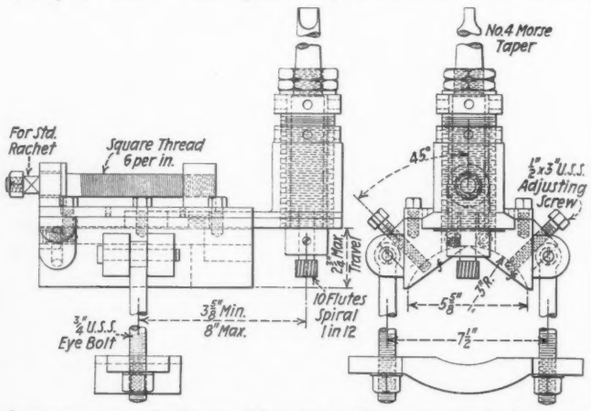
sition and faced flush to the rod. The small clamps *C* and *D* are used for holding the main bearing caps in position while facing the shells.

Shown in another illustration are various micrometers, indicators and precision instruments used in railcar maintenance work. *A*, *B* and *C* are micrometers and test bars; *D* and *H* are cylinder gages; *E* and *F* are universal indicators; *G* is a speed indicator and *I* is a set of inside micrometers.

A thorough cleaning of all parts previous to being routed through the shop is essential to accurate work. The solution used in the vat shown is Multi-Oakite. This solution will not injure babbitt, or aluminum. It is heated by a steam coil and agitated by air from the bottom. Small parts are hung on hooks or placed in buckets having perforated bottoms. Large parts are lowered into the vat as shown. Sludge which may still remain in the corners is removed with a combination of the solution and steam applied by means of the double hose and long nozzle shown in the foreground. All parts are rinsed with clear water after cleaning.

Machine for Cutting Crank-Pin Keyways

IN some shops and engine terminals it is desirable at times to have a machine which can be bolted directly on the crank pin for milling keyways. A device which is designed especially for this purpose is shown in the drawing. This keyway milling machine consists of a steel base fitted with two eye-bolts and a yoke for bolting the machine to the crank pin. The base is fitted with a cast-steel slide, the end of which is bossed and threaded for the insertion of a brass bushing in which the spindle and milling cutter revolves. The milling cutter, with 10 flutes, is held in the spindle by means of a ⅜-in. set

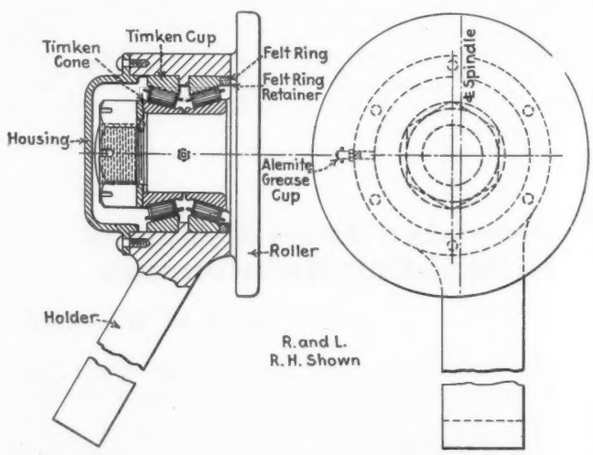


Arrangement of the machine for milling crank-pin keyways

screw. The spindle shank is of No. 4 Morse taper for the application of an air motor. The slide is fed into the cut by means of a feed screw fitted with six square threads per inch. It is fed manually by means of a ratchet wrench. Maximum travel of slide is 4⅜ in.

Journal Roller for Driving-Wheel Axles

A DRIVING wheel journal roller fitted with Timken roller bearings is shown in the drawing. The roller and integral shaft, on which is pressed the roller-bearing cone, is held in the housing by means of a castellated nut. The roller bearings are grease lubricated, and the housing is fitted with Alemite grease cups for applying



Driving-wheel journal roller fitted with Timken roller bearings

the grease. The felt ring container set between the roller-bearing cup and the roller eliminates the grease from seeping out of the housing. The roller is placed off center as shown in the drawing. It is made in both right-hand and left-hand styles since the holder is set obliquely to the roller wheel. The application of roller bearings has been made to secure a tool which will render satisfactory service for a long period of time.

Locomotive Inspection-Pit Equipment

INSPECTORS located at the inbound locomotive inspection pit must be furnished with the proper tools and instructions. A cabinet containing various gages and other equipment, if located in the inspectors quarters at the pit, will meet with the approval of the

A cabinet of this kind keeps the inspector's working tools where he can find them

inspectors themselves as well as the rest of the local supervisors. General letters, circulars and blue prints with which the inspectors must be familiar, together with copies of the I.C.C. Manual of Locomotive Inspection, can be kept in plain view and are easily accessible to the inspectors and others whose duty it may be to review these instructions from time to time.

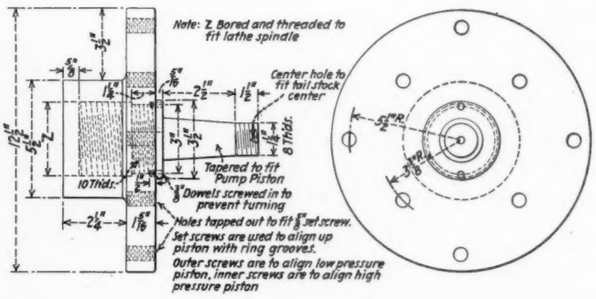
Arbor for Turning Compressor Air Pistons

By E. G. Jones

THE arbor shown in the sketch is made for turning 8½-in. compressor air pistons. Often an air piston has to be turned to fit the pump cylinders and it is a difficult feat to accomplish without the aid of a fixture.

There are many methods used in various shops for accomplishing this. Each one of them gives trouble in properly aligning the ring grooves in turning. If the alining is not properly done, when the ring grooves are cut deeper in the piston, the lathe tool will cause a wide ring groove to be cut which will, of course, condemn the piston.

This arbor overcomes this difficulty in that set screws are applied in the holes tapped for the screws and after the piston has been placed on the arbor it is properly alined by means of the set screws. There are two sets of holes in the arbor. The ones on the smaller radius



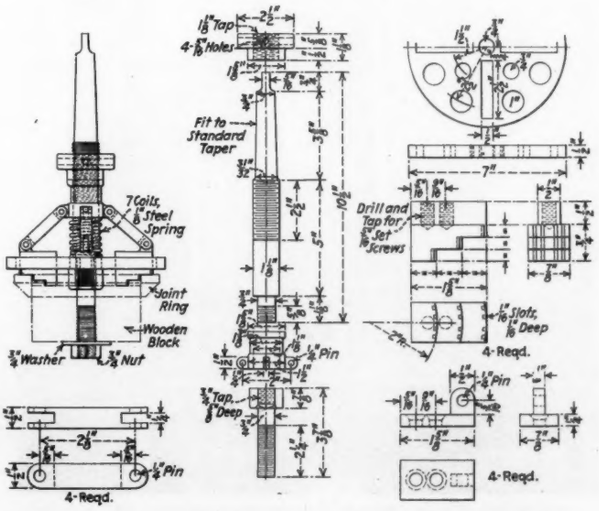
Arbor for turning 8½-in. compressor air pistons

are used for alining the high-pressure pistons, while the ones on the larger radius are for alining the low-pressure pistons. When the proper alinement is made, the nut on the tapered fit of the arbor is made tight and the piston turned.

The base or body of the arbor is made of cast iron and threaded in the large bore to fit the lathe spindle. The tapered piston fit is made of steel and is screwed into the cast-iron body and doweled with ⅜-in. pins to prevent turning at any time. A similar arbor may be made for 9½-in. air pistons.

Chuck for Holding Grinding Blocks

THE usual procedure of placing steam-pipe joints on tapered wooden blocks for grinding the seats is often unsatisfactory from the operator's standpoint, especially when the block becomes badly worn and the ring slips. To overcome the difficulty of having the joint



A chuck for holding joint rings when grinding steam-pipe joints

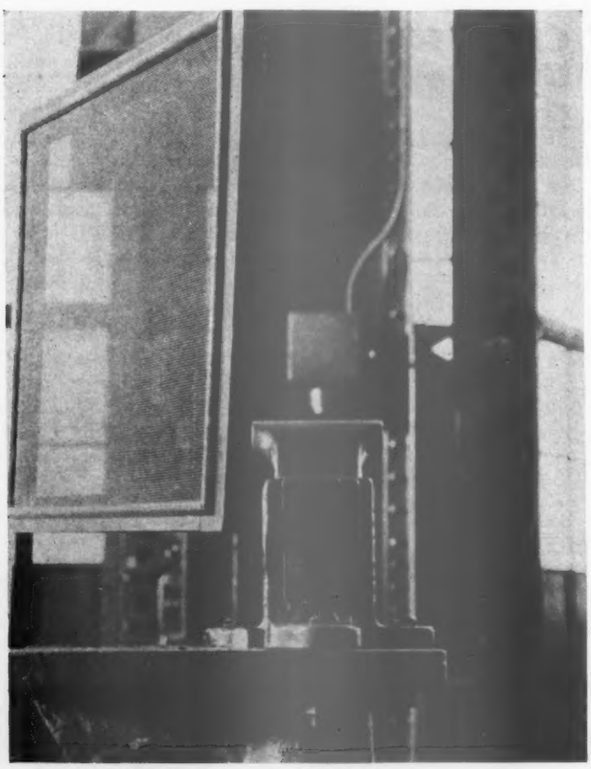
ring off center on the block as a result of this slipping, the chuck shown in the drawing has been designed on one railroad for holding the joint ring while grinding. The chuck consists of a spindle and a chuck which is locked at one end by a special jamb nut and at the other by an adjusting nut which controls the opening and closing of the chuck jaws. A seven-coil ⅛-in. steel spring is placed on the spindle immediately behind the chuck to serve as the tension member which holds the chuck jaws out against the joint ring as it is compressed by the adjusting nut. The special jamb nut which holds the chuck against the spindle is 3⅞ in. in overall length and serves to hold a straight-side wooden block on the end of the spindle. The wooden block is used only to guide the joint ring on its seat as it is being ground.

When in use the correct size block is chosen for the joint ring which is to be ground. The ring is placed over one end of the block, leaving a portion of the ring to serve as a grip for the chuck jaw. The adjusting nut which controls the movement of the chuck jaws is loosened sufficiently to permit the insertion of the stepped teeth on the jaws inside the joint ring. The tightening of the adjusting nut forces the chuck jaws outward, securely holding the joint ring and the block.

Safety Screen When Chipping on a Vise

By "Safety First"

"DON'T chip toward the gangway" is a sign frequently seen in shops and enginehouses. But in spite of precautions chips fly about which occasionally land in someone's eye. The handy vise chipping screen illustrated is arranged somewhat like a flag. The mast is inserted in a ⅜-in hole in the vise bench. This permits considerable adjustment by swinging the screen around, and it may be instantly removed from the vise stand when not in use.



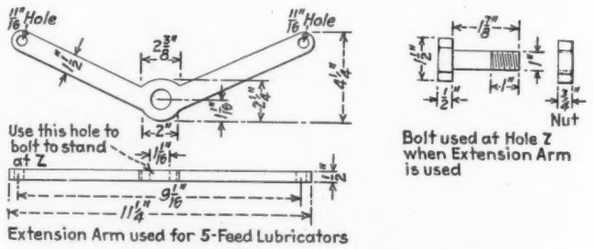
Safety screen designed to stop flying chips when chipping on a bench vise

While on the subject of chips it might be mentioned that there is opportunity for considerable ingenuity in designing sheet-metal chip guards for planers, shapers and other machine tools. When taking a heavy cut in brass a planer will scatter chips far and wide. By attaching a properly bent piece of sheet metal to the tool holder it is possible to catch most of the chips.

Repair Stand for Hydrostatic Lubricators

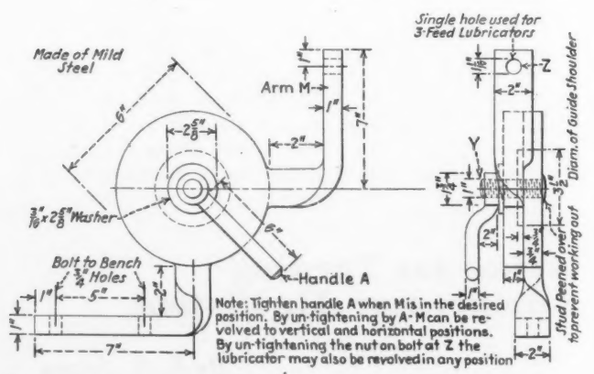
By E. G. Jones

THE repair stand for hydrostatic lubricators, shown in the two sketches, has proved useful in the air-brake department where lubricators are repaired. In many shops these lubricators are repaired while held rigid in a bench vise. This is undesirable as the lubricator must be removed and revolved to various positions during the progress of the work.



Extension arm used for five-feed hydrostatic lubricators

The repair stand shown can be used for three- and five-feed lubricators. When a five-feed lubricator is to be repaired, the extension arm is applied to the stand and removed when a three-feed lubricator is to be repaired.



Horizontal and vertical work stand for hydrostatic lubricators

This is because of the different design of holding studs for the two lubricators. The lubricator may be revolved about *Z* so as to allow the feed units to be on top for easy removal or replacement. It may also be revolved about the stud *Y* so as to have the "eyes" or windows of the lubricator on top for removal or replacement.

NEW DEVICES

Niles Locomotive Axle Journal Grinder

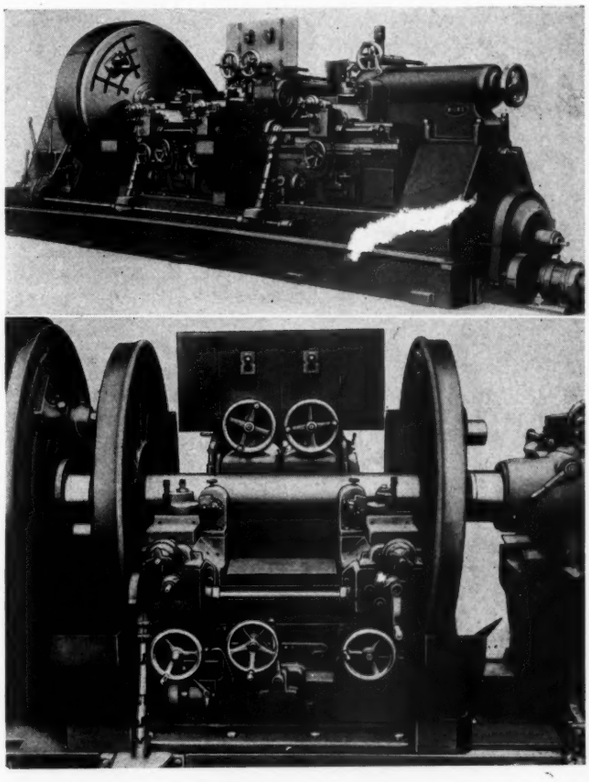
SIMULTANEOUSLY with the announcement by the Niles Tool Works Company, Division General Machinery Corporation, Hamilton, Ohio that it was manufacturing a machine for grinding locomotive axle journals, the March issue of the *Railway Mechanical Engineer* contained a brief statement of the salient features of the machine on page 154. Elaborating the above announcement is the following complete description of this device:

The machine is arranged with two grinder heads to grind simultaneously two inside journals up to 18 in. in length, and it is provided with two independently operated tool rests for facing the hub liners or turning the journals. The swing over the bed is 90 in.; the maximum distance between centers 10 ft. 0 in.; the face plate diameter 72 in.; and the face plate speeds 10 to 30 r.p.m.

Grinding Unit for Inside Journals

This unit is mounted on the main bed. It consists of a heavy base casting with the grinding heads mounted at the rear, the carriages for turning mounted at the front, and the power mechanism for reciprocating the grinding heads built directly into the base. The grinding head unit consists of a sub-base and two grinding heads each fitted with a grinding wheel and independent power driving means for each wheel. The heads are provided with lateral adjustment so as to allow them to be set up to grind journals of from 12 in. to 18 in. in length without over-travel of the wheel for the different length journals. The sub-base is fitted and gibbed to V-ways on the base for lateral movement to the grinding wheels, and each grinding head is fitted and gibbed to V-ways for an in-and-out movement of the grinding wheels.

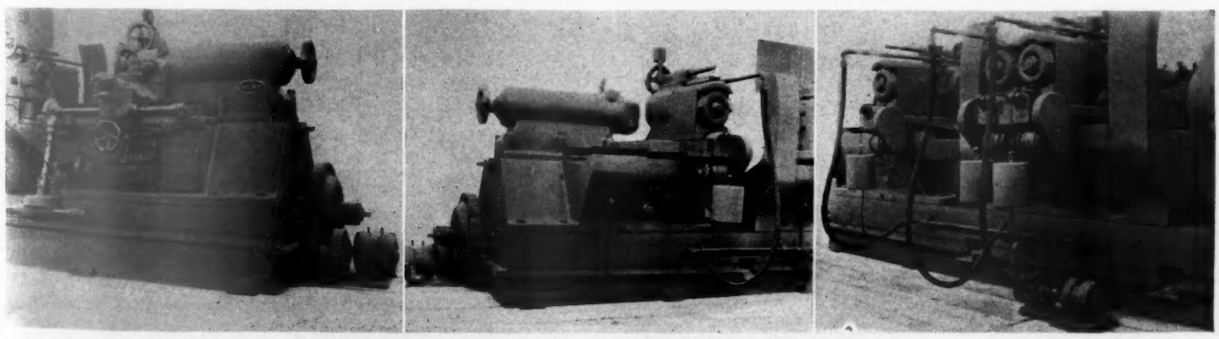
The grinding wheels are of a diameter as large as operating conditions will permit. Each wheel is driven by a 12-hp. motor through gearing to the spindle. The spindle and all drive shafts revolve in anti-friction bearings. The grinding heads move laterally on the bed through rack and pinion, the reciprocating movement being obtained through a reversing mechanism (as furnished by the Cincinnati Grinder Company) which is mounted on the front face of the base. This mechanism is operated through a 1-hp. motor mounted in the base. Each head is fitted with quick in-and-out traverse through an independent 1-hp. motor. Hand micrometer in-and-out movement is also provided through a large hand wheel. All electric control stations and operating



Top: General view of the Niles locomotive-axle journal-grinding machine—Bottom: The journal-grinding units

mechanisms are conveniently located for the operator so as to speed up production.

The two carriages for turning the journals are fitted and gibbed to V-ways at the front section of the base. Compound tool rests are fitted and gibbed to V-ways on the carriage for in-and-out movement. The carriages are provided with power longitudinal feed for turn-



Left: A front view of the tailstock arranged with grinding and cutting attachment—Center: The rear of the tailstock—Right: A rear view of the grinder-head drive motors, power-traversing motors and the fluid pump and fluid distribution system

ing journals and power cross feed for facing hub liners, the feeds being engaged and disengaged both for cut-out and direction, at the tool rest. The feeds are reversible and feed changes of 1/32 in., 1/16 in. and 1/8 in. are obtained through a feed box located on the headstock. Hand movement is also provided for both longitudinal and cross feed. The cross feed is provided with a micrometer dial so as to expedite the setting of the cutting tool. The feed screws are provided with ball-thrust bearings and felt wipers protect the slides from dirt and chips. The tool holders are of the single-screw clamping type to allow angular setting. The tools are held in place by two large set screws. A holder is also provided with a thousandths reading gage, to be clamped in the tool post for feeding across the journal to determine its lowest point of wear.

The headstock is mounted on the bed and traversed laterally through an independent 5-hp. motor. Both the bed ways and the headstock seats are fitted with renewable steel wear-plates; those on the bed ways being hardened. Felt wipers are provided to protect the ways from dirt and chips. The headstock is clamped in position by two T-head bolts drawn tight through a unit eccentric clamp. The upper faces of the clamping T-head slots are protected with renewable steel wear-plates.

The headstock spindle is of the non-rotating type and the work revolves on a live center built directly into the spindle. The spindle in-and-out movement is accomplished through a hand wheel conveniently located. The 15-hp. drive motor is mounted on the back of the headstock and is connected to the gear box through a flexible drive. The gears are enclosed and run in oil.

The face plate revolves on a large bronze bearing and is driven by V-belts from the gear-box shaft. The belts have a circumference drive contact on the rim of face plate of 270 deg. This belt drive has been adopted because it is considered to be the most desirable for obtaining a smooth finished journal.

The face plate carries an adjustable built-in counterweight which counterbalances the different classes of wheel sets from the zero to the heaviest main drivers. The counterweight is guided in tee slots for position, and is moved through gears and screw by a crank wrench placed on a square on the front face of the face plate. Locking bolts clasp the counterweight in its adjusted position. A hand brake with large shoe contact area on the rim of the face plate provides an immediate stop for position. Two ovals are provided in the face plate for receiving the crank pin of either right or left-hand lead engines. This allows wheel sets of either type to be chucked changing any mechanism on the machine other than to set the counterbalance in its proper position with respect to the type of wheel set chucked. A driver dog is furnished for driving the wheel set. An ammeter is located on the front of the headstock which enables the operator to detect when wheels are not properly counterbalanced.

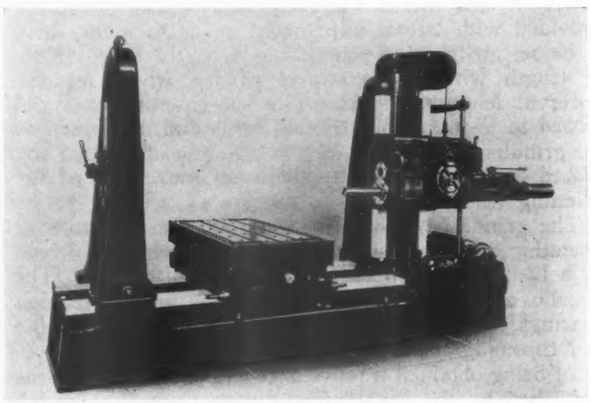
The tailstock is mounted on the bed and traverses laterally through an independent 5-hp. motor. Both the bed-ways and tailstock seats are fitted with renewable steel wear-plates; those on the bed-ways are hardened. Felt wipers are provided at the bed-way areas to protect the ways from dirt and chips. The tailstock is clamped in position by two tee-head bolts drawn tight through a unit eccentric clamp. The spindle is moveable in and out by a hand wheel and is clamped in any fixed position by a positive type of clamp which does not affect its alinement. A live-dead center mounted on anti-friction bearings is built directly into the spindle.

The bed of the unit is of heavy construction and is so arranged to catch and drain the fluid compound to a central reservoir. The fluid compound is circulated to all grinding units by a rotary pump driven by an independent 1-hp. motor. Suitable guards are provided over belts around the grinding heads, over the wear areas and feeding mechanism where possible, for confining the spray of the fluid compound.

Three of the machines have been installed on the Canadian National at the Point St. Charles, Montreal shops; at the Stratford, Ontario shops; and the Transcona, Winnipeg shops. Tests on these machines show floor to floor time of 43 min., 32 min. and 33 min. for refinishing the journals of standards size driving wheels. The speed of the machine in all instances for turning and grinding was 30 r.p.m. and 15 r.p.m respectively at 1/16 in. feed.

Giddings & Lewis No. 30 Boring Drilling and Milling Machine

TWO spindles, the conventional main spindle and an auxiliary high-speed spindle, comprise one of the important features of another machine recently added to the line built by the Giddings & Lewis Machine Tool Company, Fond du Lac, Wis. This machine is known as the No. 30 horizontal boring, drilling and milling machine. The main spindle, 3 in. in diameter, gives 36 speeds in fine geometrical progression between 8.3 and 500 r.p.m. The auxiliary high-speed spindle, 2 in. in diameter and mounted within the back gear shaft of the main spindle, gives an additional 36 speeds between 25 and 1,500 r.p.m. These two spindles give a combined



Giddings & Lewis No. 30 two-spindle horizontal boring drilling and milling machine

speed range of from 8.3 to 1,500 r.p.m. It is fitted with herringbone gears and preloaded combination radial and thrust ball bearings. The No. 30 machine is similar in detail and operation to the No. 70 machine of the same type and which was described in detail on page 326 of the June, 1931, issue of the *Railway Mechanical Engineer*.

The bed of the machine is of heavy box-type construction, internally ribbed to support the various units of the machine. A large cutting lubricant tank is cast within the bed, and when required provision is made on the different units for directing the solution back to this tank.

The table is of semi-steel and of ribbed box section.

(Continued on next left-hand page)

The top of the table has 1-in. stop holes and five standard tee slots for ¾-in. diameter bolts. Chip pockets are cast in the table at each end and the tee slots run the full length of the table. The bottom of the tee slots is drilled so that chips can fall through to the center cored hole.

The table is supported on a saddle which supports the table at every position of its cross travel. A multiplying lever clamp is used for clamping the table to the saddle and also the saddle to the bed.

Within the front head end of the bed is built a separate feed unit for moving the different units. The milling feeds are obtained from a separate drive shaft ahead of the start, stop and reverse clutches. In this way the reversal of the machine does not reverse the feed or rapid traverse. The rapid traverse is always in the same direction as the feed. The levers for engaging the feed to any unit are engaged by moving the lever in the direction the unit is to move, either by feed or rapid traverse. This feature removes all uncertainty as to which direction the units will move as soon as the feed or rapid traverse is applied and permits a directional control of the different units of the machine, independent of every other unit.

The hand feed for moving the different units is through a safety crank handle. To feed by hand, the crank handle must be held in a jaw clutch against the spring. As soon as the hand is removed the crank is disengaged and swings free. This safety feature prevents injury to the operator and possible damage to the machine if the rapid traverse should be engaged without first removing the crank handle. The mechanism for the movement of the different units is equipped with micrometer dials, which are adjustable by a thumb screw permitting them to be set in any position desired by the operator.

This No. 30 machine, like the No. 70 two-spindle machine can be furnished in the table type, planer type and floor type, using the same principal units in all three types.

Additional principal specifications of this machine are as follows: Range of feeds to main spindle in inches per revolution of spindle—.007 in. to .375 in.; range of feeds to auxiliary spindle in inches per revolution of spindle—.002 in. to .125 in.; range of milling feeds in inches per minute—.8 in. to 40 in.; rapid traverse to all units—120 in. per minute.

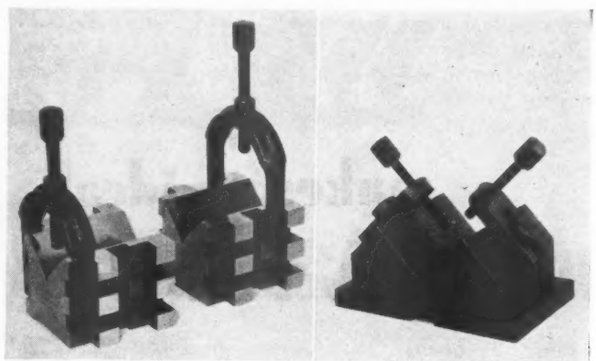
B. & S. Metal-Slitting Saws And V-Blocks

THE Brown & Sharpe Manufacturing Company, Providence, R. I., has recently added to its line of cutters 21 sizes of metal-slitting saws with side-chip clearance. These saws, which are made of high-speed steel, have been developed to increase production and lessen cutter breakage, because the design permits the chips to be carried out of a deep slot without jamming the saw in the work.

Large chip space is provided; in addition to the pockets at the sides of the teeth, the sides of the saws are recessed. There is also concavity on the lateral cutting edges. The extra clearances reduce rubbing and dragging with attendant heating and jamming tendencies.

The saws are made in diameters from 3 in. to 8 in. in a suitable range of thicknesses. The teeth of saws up to and including 5/32-in. thickness are made in conventional straight tooth type; saws of 3/16-in. thickness are made in staggered tooth type.

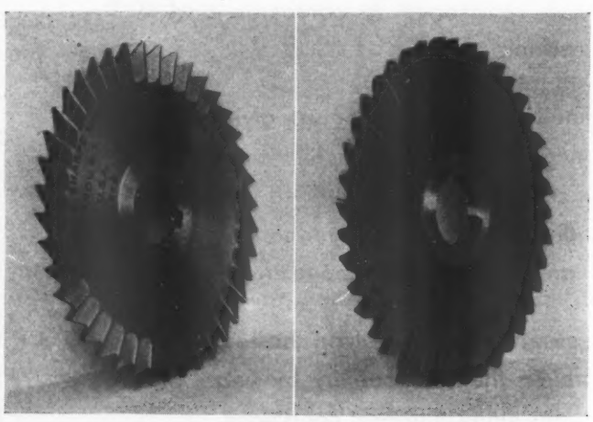
This company has also recently announced two tools known as V-blocks and clamps No. 750B and V-block No. 750C. V-blocks and clamps No. 750B has stepped clamping lugs and the blocks can be used on their sides as the clamps do not project. The stepped construction



Left: The Brown & Sharpe No. 750B V-blocks and clamps —Right: The No. 750C V-block

also allows changing the clamps quickly from small work to work up to 2 in. diameter. The blocks are ground in pairs and all sides are at right angles; they can be used in any position. Also the V grooves of any pair of blocks are ground central and in alinement. Each blocks is of hardened steel 2½ in. long, 2¾ in. wide and 2 in. high and are made and sold only in numbered pairs. The clamps are drop forged and the clamp screws are hardened.

V-Block No. 750C is designed to hold stock of square or rectangular cross section, as well as round



Left: The B. & S. straight-tooth metal-slitting saw designed with side-chip clearance—Right: The staggered-tooth type of saw which is made in thickness of 3/16 in. and over

stock, leaving the entire top side of the work accessible. A hole through the center of the block allows drills, drifts, etc., to project through the work. A tongue in the bottom is a convenience when the block is used on a machine table where it can be clamped by the flanges in the customary manner. The 750C-block is of hardened steel 3 in. long, 4¾ in. wide, 2 in. high and is ground on its bottom side. It has a capacity for round stock up to 1½ in. diameter.

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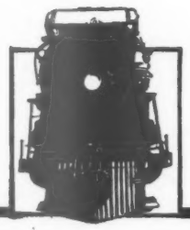
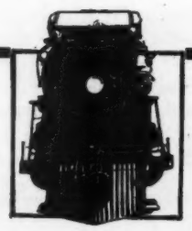


DEPRESSION
has forced
Locomotive Obsolescence

- AS LONG as the traffic was there to move, the railroads were not under pressure to weed out the older power.
- But depression has had a selective effect and the necessity of returning the maximum net out of a diminishing gross has forced the intensive use of the most efficient motive power.
- With the return of normal business, the necessity of maintaining the maximum net will prohibit the introduction of the older and less efficient locomotives into a schedule of operation adjusted to the use of highly efficient motive power.
- Do not let the old locomotives waste the increasing gross. Buy new Super-Power and keep efficiency up to its present standard.

LIMA LOCOMOTIVE WORKS
Incorporated

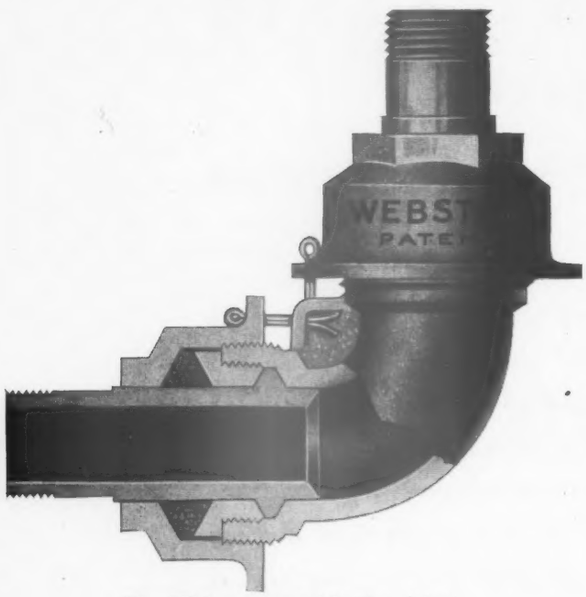
LIMA — LIMA LOCOMOTIVE WORKS INCORPORATED — OHIO



The Webster Rotatable Pipe Joint

THE National Bearing Metals Corporation, St. Louis, Mo., has recently placed on the market the Webster rotatable pipe joint. The joint is made of bronze and carbon-steel tubing and is so designed that the contact point at the seat will always remain in the same relative position. The joint does not depend on the packing gland for its efficiency. It holds the male member in a parallel position, absorbs vibration and makes a long bearing, to prevent cramping.

It is made in the straight-joint and the double-joint types, the former being designed to rotate in one plane



The Webster rotatable pipe joint

only while the latter is rotatable in two planes at right angles to each other. Both types are made in various sizes from ¼ in. to 6 in. in diameter, all threads being of standard pipe size. Larger sizes of joints can be furnished if desired.

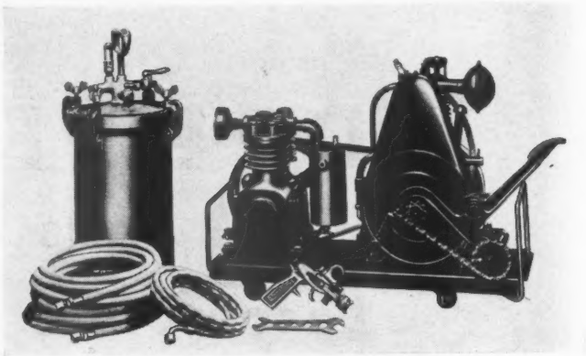
The Webster rotatable pipe joint is designed for applications where flexibility is required, replacing hose connections on passenger cars, locomotives, enginehouse blower connections, on steam shovels, trip hammers, etc.

Smith Tool for Parting Pistons—A Correction

IN the description of the Smith Strong-Back piston parter, produced by the Clark Manufacturing Company, 110 Turner street, Philadelphia, which appeared on page 333 of the June, 1931, issue of the *Railway Mechanical Engineer*, it was stated that the rear yoke is fitted with a hydraulic cylinder and piston operated by a ratchet wrench, the piston of which is set against the end of the locomotive piston rod. This is incorrect; the Smith tools develop their power by mechanical means instead of by hydraulic pressure. The Strong-Back parter uses the same wedge-and-roller principle which is applied to the Smith piston parter, but applies the pressure on the outside of the crosshead member.

DeVilbiss NH606 Paint-Spraying Outfit

A LIGHT-duty spray-painting outfit driven by a gas-engine has recently been developed by The DeVilbiss Company, Toledo, Ohio. This equipment, known as the NH606, makes possible spraying-painting of light or small work at points where electric current



The DeVilbiss NH606 paint-spraying outfit

is not easily available and can be carried by one person or in any standard make automobile

The outfit consists of one DeVilbiss spray gun with adjustable spray head and wrench; one 20-ft. length 5/16-in. air hose and connections; one 12-ft. length ¼-in. braid-covered hose and connections; one 12-ft. length 5/16-in. DeVilbiss fluid hose and connections; one QN 2-gal. paint tank and one NH ½-hp. gas-engine driven compressing equipment, mounted on a hand truck.

The Mercury Type D Gas Tractor

IN the illustration is shown the Mercury Type-D gas tractor designed and built by the Mercury Manufacturing Company, 4118 South Halstead street, Chicago, The tractor is for use as a pulling unit to handle trailing loads. It is equipped with a Ford Model-A industrial engine with a Model-AA truck clutch and 4-speed transmission. The driving axle is of the Mercury balanced internal-gear type which is of full floating design. All

(Continued on next left-hand page)

The Mercury Type-D tractor for hauling trailing loads

TANDEM MAIN ROD DRIVE

...extends time between shoppings

TANDEM MAIN ROD DRIVE saves a lot of wear and tear on rod bushings.

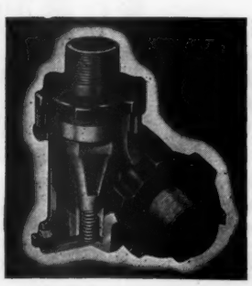
The distribution of piston thrust over four main outside crank pins naturally reduces bearing pressures.

The experience of one road where a certain class of locomotive contains some with and some without shows the striking maintenance economies of the Tandem Main Rod Drive.

Locomotives so equipped are running for many months after the others have been shopped for rod and driving box work.

Tandem Main Rod Drive is needed to handle the power generated by modern Super-Power. On any locomotive, its use is justified by safety and the lowered rod maintenance that results.

THE FRANKLIN SLEEVE JOINT



Saves gaskets and *lowers maintenance*

FRANKLIN RAILWAY SUPPLY COMPANY

Incorporated

NEW YORK ST. LOUIS CHICAGO
SAN FRANCISCO MONTREAL

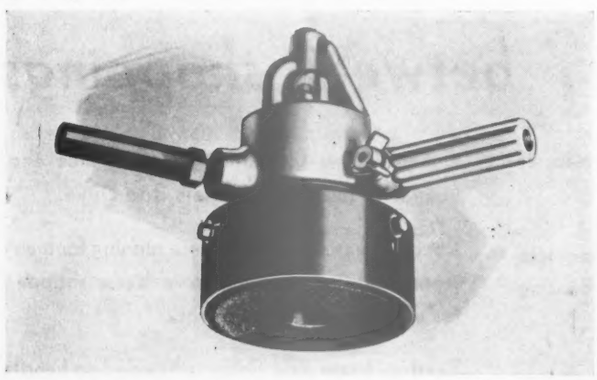
shafts, gears and pinions are of alloy steel; the rear-axle shafts being chrome-nickel steel.

The frame of the tractor is made from channels which are bolted at the front to a steel bumper plate and riveted to a cast weight block at the rear. The power plant is mounted within the frame with a three point suspension for the engine. The driving axle is bolted to the frame; no spring suspension is used, this design being adapted to secure minimum overall length, large diameter driving wheels with low center of gravity and simplicity in connecting the power plant to the axle. The front axle is a steel casting that supports the frame on semi-elliptic springs.

The tractor is designed to travel at a speed of 13.5 m.p.h. at an engine speed of 1,750 r.p.m and to deliver a suspension drawbar pull of 750 lb. at 10 m.p.h. Under unusual operating conditions a low gear is made available in order to produce 2,500 lb. drawbar pull. The tractor is 85 in. long, 59 in. high and 45 in. wide with single tires and 57 in. wide with dual tires. The short wheel base of the tractor permits it to negotiate 75 in. intersecting aisles, the minimum inside radius of which is 43 in. and the minimum outside radius 104 in.

Ingersoll-Rand Multi-Vane Surface Grinder and Sander

A GRINDER and sander of the Multi-Vane type FP-2, designated as the 4F size, has been added to the line of Ingersoll-Rand Company, 11 Broadway, N. Y. This tool is designed for grinding, sanding, polishing, and wire brushing operations and can be fitted with a grinding wheel, sanding head, or wire brush for sanding and polishing passenger-car bodies,



The Ingersoll-Rand size 4F Multi-Vane grinder and sander

smoothing down welds, cleaning and surfacing large castings for painting, polishing locomotive side rods, sanding metal furniture, dies and other metal and wood surfaces, and wire brushing.

The machine is built with two handles so that the operator can hold it at right angles to the working surface. One of the handles may be removed to facilitate working in close quarters. The second handle acts as the air inlet and contains a thumb-controlled throttle valve.

The standard free speed of the tool is 4,600 r.p.m., but units can be furnished for higher or lower speeds. Overspeed is prevented by a governor. The size 4F grinder and sander weighs 10¾ lb.

Worthington Type-D Centrifugal Pump

THE centrifugal pumping unit shown in the illustration is a product of the Worthington Pump & Machinery Corporation, Harrison, N. J. It is designed with the pump bolted to the extended motor frame, the impeller being mounted on the end of the continuous motor shaft. The pumping unit has been designated as the Type-D Monobloc centrifugal pump. The impeller is of bronze and incorporates the shaft sleeve as an integral part, this design being adopted as a shaft-protection feature. The impeller is also fitted with a cadmium-plated steel locking device.

The Worthington type-D Monobloc pumping unit

The unit is equipped with a ball-bearing Masterbilt motor, incorporating standard electrical construction. Motors ranging from ½-hp. to 5-hp. capacity can be used with the unit, depending upon the capacity desired. These motors, running at speeds ranging from 1,725 r.p.m. to 3,425 r.p.m., can be furnished for 115-Volt direct current or for alternating current of 110, 220, 440, or 550-volts. The capacity range of the pumping unit is 10 to 140 gal. per min. All ratings are based on a maximum suction lift of 15 ft. The pump can be used as a built-in part of assembled equipments for air-conditioning apparatus, ice, water and brine circulation, etc.

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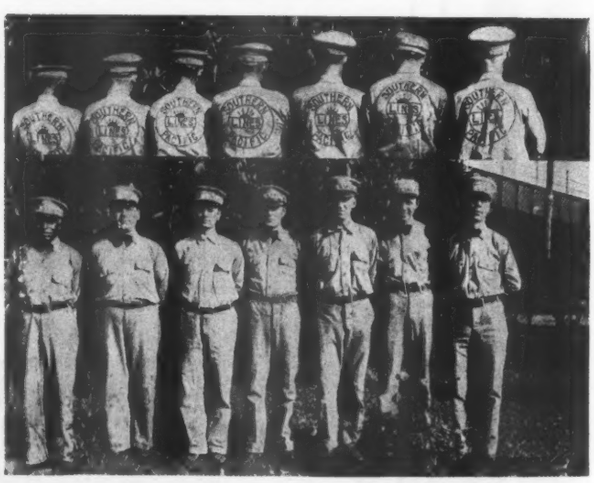
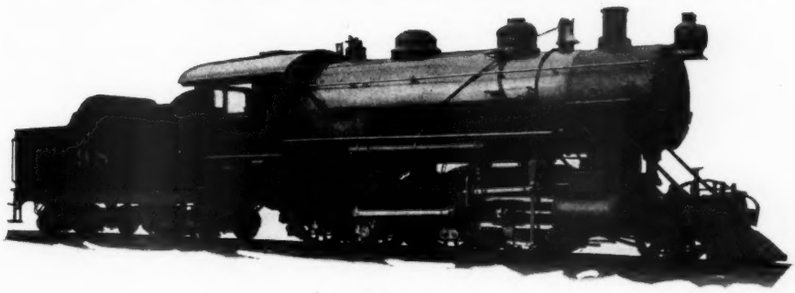


Car men adopt uniforms

The car inspectors and car oilers employed on the Houston division of the Southern Pacific at San Antonio have adopted and purchased uniforms and now wear them both for the purpose of indicating their occupation and advertising the company. We show here the inspector and oiler crew and their new garb.

AN URGENT QUESTION— MOTIVE POWER MODERNIZATION



THE FREIGHT HAULER OF TWENTY-FIVE YEARS AGO

2-8-0 Type

Cylinders	22″ x 30″
Drivers, diameter	63″
Steam pressure	200 lb.
Grate area	49.5 sq. ft.
Heating surface	2916.8 sq. ft.
Weight on drivers	181,550 lb.
Weight, total engine	204,900 lb.
Tractive force	39,300 lb.

TODAY'S STRICTLY MODERN POWER REDUCES OPERATING COSTS

4-8-4 Type

Cylinders	27″ x 32″
Drivers, diameter	70″
Steam pressure	250 lb.
Grate area	96.2 sq. ft.
Water heating surface	5189 sq. ft.
Superheating surface	2360 sq. ft.
Weight on drivers	274,100 lb.
Weight, total engine	454,090 lb.
Tractive force	70,750 lb.

THESE TWO locomotives, representing typical freight motive power of strictly modern design 25 years ago and today, afford a striking comparison. With an increase in steam pressure of 25 per cent, in steam temperature of 80 per cent, in starting tractive force of 80 per cent, and in grate area of 94 per cent, the new locomotive produces a horsepower-hour on approximately one-third less fuel and water than the old. These figures only partially illustrate the advantages to be derived from operating the new power of today.

Many locomotives built as recently as ten years ago have neither the speed capacity now required, nor the modern equipment which helps to reduce operating costs. As approximately eighty per cent of the locomotives in use today are ten or more years old, is it not essential for the railroads, if they are to efficiently meet the existing traffic demands, to adopt a systematic program for replacing the old locomotives with strictly modern power?

We are prepared, as never before, to aid in answering this question.

THE BALDWIN LOCOMOTIVE WORKS 1831 1931

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

Among the Clubs and Associations

WESTERN RAILWAY CLUB.—J. H. Nash, western manager of the Dri-Steam Valve Sales Corporation at Chicago, has been elected secretary of the Western Railway Club.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—George W. Rink, mechanical engineer of the Central Railroad of New Jersey, has been elected chairman of the Plainfield (N. J.) Section of the American Society of Mechanical Engineers. Mr. Rink was vice-chairman of this Section and also has been active in the work of the Railroad Division of the society.

NEW YORK RAILROAD CLUB.—The summer outing of the New York Railroad Club on June 30 was attended this year by 575 members of the club and their guests. This outing combined both the golf tournament and the field sports, all in one place for the first time, at the grounds of the Westchester Country Club, Rye, N. Y. The chief enthusiasm was as usual centered in the golf games and tournaments, the players having started early in the day, and continued until its close. The regular annual golf tournament, which was open to members and guests, provided for the awarding of a number of beautiful and useful prizes. Prizes were also presented to winners of other events. ¶The second annual open team championship for railroad and railroad supply companies was won by the American Brake Shoe & Foundry Company. The exhibition match was closely followed by a large gallery. The contestants in this foursome were Jess Sweetser and Gene Tunney versus R. T. Jones, Jr. and George Voight. The match was won by Jones and Voight—4 up and 2 to play. The other golfing events included driving and putting contests for those who played in the golf tournament; also similar contests for non-golfers. In the evening, the Westchester Country Club provided a dinner at 7:30 during which time, following the address of George LeBoutillier, president of the New York Railroad Club, prizes were awarded to the successful contestants in the various events. The committees this year were in charge of J. S. Doyle, general chairman; Maurice N. Trainer, golf chairman; and Thomas P. O'Brian, field chairman. The attendance included, in addition to a number of railroad executives, many railroad men and those from allied manufacturing industries.

Club Papers

Interchange Rules Discussed

Railway Carmen's Club of Peoria and Pekin.—Two meetings were held on May 15 at the Union Station, Peoria, Ill. The morning meeting was held at 10 a.m. for the members who work at night and the regular meeting was held at 6:30 p.m. Both meetings were addressed by W. J. Owen, chief interchange inspector at Peoria, Ill., who discussed and explained Interchange Rules 4, 32 and 44. Mr. Owen, aside from discussing the above interchange rules, emphasized the necessity of co-operation at all times between all members of the car department and stressed particularly the necessity of car inspectors doing their utmost in speeding cars in interchange by prompt handling to the repair track so that repairs can be completed in time to forward the car in the train for which it is scheduled.

Lackawanna Electrification

New York Railway Club.—Meeting held on May 15 at the Engineering Society's Building, 29 West 39 Street, New York. The meeting, designated as "Lackawanna Night," was attended by more than 800 members and guests. ¶Entertainment of the evening was provided by D. L. & W. Glee Club of 23 male voices, the members of which are recruited from among the employees of the Buffalo Division. The first paper of the evening was presented by G. J. Ray, chief engineer of the Lackawanna who discussed the D. L. & W. suburban electrification in New Jersey. ¶A paper "High Spots of Electrification on the Lackawanna" was next presented by E. L. Moreland, of Jackson & Moreland, consulting engineers of Boston, Mass. Mr. Moreland discussed the reasons why the 3,000-volt current system was adopted for the Lackawanna conditions, the selection of equipment, the supplying of direct current power from the sub-stations through rectifiers and operating speeds. ¶Following this address, J. S. Thorp, electrical engineer of the Lackawanna, gave an "Informative and Interesting Description of Sub-Stations and Construction of Catenary System." This part of the evening's program was illustrated with slides showing the five sub-stations and the Catenary construction of the electrification. ¶J. J. Pierce, assistant superintendent of the Lackawanna, addressed the meeting on "My Experience with Commuters." ¶The next paper of the evening "Multiple-Unit Cars, Three-Power Locomotives and Training of Employees for D. L. & W. Electrification" was presented by E. E. Root, division master mechanic of the Lackawanna. ¶The last paper of the evening entitled "Signals and Interlocking" was presented by J. E. Saunders, signal engineer of the Lackawanna.

Directory

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of mechanical associations and railroad clubs:

AIR-BRAKE ASSOCIATION.—T. L. Burton, Room 5605 Grand Central Terminal building, New York.

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, Chicago.

AMERICAN RAILWAY ASSOCIATION.—DIVISION V.—MECHANICAL.—V. R. Hawthorne, 59 East Van Buren street, Chicago.

DIVISION V.—EQUIPMENT PAINTING SECTION.—V. R. Hawthorne, Chicago.

DIVISION VI.—PURCHASES AND STORES.—W. J. Farrell, 30 Vesey street, New York.

DIVISION I.—SAFETY SECTION.—J. C. Caviston, 30 Vesey street, New York.

DIVISION VIII.—CAR SERVICE DIVISION.—C. A. Buch, Seventeenth and H streets, Washington, D. C.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, 11402 Calumet avenue, Chicago.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Carlin W. Rice, 29 W. Thirty-ninth street, New York.

RAILROAD DIVISION.—Paul D. Mallay, chief engineer, transportation department, Johns-Manville Corporation, 292 Madison avenue, New York.

MACHINE SHOP PRACTICE DIVISION.—Carlos de Zafra, care of A. S. M. E., 29 West Thirty-ninth street, New York.

MATERIALS HANDLING DIVISION.—M. W. Potts, Alvey-Ferguson Company, 1440 Broadway, New York.

OIL AND GAS POWER DIVISION.—L. H. Morrison, associate editor, Power, 475 Tenth avenue, New York.

FUELS DIVISION.—A. D. Black, associate editor, Power, 475 Tenth avenue, New York.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 7016 Euclid avenue, Cleveland, Ohio.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce street, Philadelphia, Pa.

AMERICAN WELDING SOCIETY.—Miss M. M. Kelly, 29 West Thirty-ninth street, New York.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Joseph A. Andrucetti, C. & N. W., Room 411, C. & N. W. Station, Chicago, Ill.

CAR DEPARTMENT OFFICERS ASSOCIATION.—A. S. Sternberg, master car builder, Belt Railway of Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITH'S ASSOCIATION.—W. J. Mayer, Michigan Central, 2347 Clark avenue, Detroit, Mich.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. T. Winkless, Room 707, LaSalle Street Station, Chicago. Business session, without exhibit or entertainment, September 15 and 16, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—William Hall, 1061 W. Wabash street, Winona, Minn.

MASTER BOILERMAKER'S ASSOCIATION.—A. F. Stiglmeier, secretary, 29 Parkwood street, Albany, N. Y.

MASTER CAR BUILDERS' AND SUPERVISORS' ASSOCIATION.—See Car Department Officers Association.

NATIONAL SAFETY COUNCIL—STEAM RAILROAD SECTION.—W. A. Booth, Canadian National Montreal, Que. William Penn and Fort Pitt Hotels, Pittsburgh, Pa.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 1124 Woodward building, Washington, D. C.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio, Baltimore, Md.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver building, Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, American Railway Association.

SUPPLY MEN'S ASSOCIATION.—E. H. Hancock, treasurer, Louisville Varnish Company, Louisville, Ky. Meets with Equipment Painting Section, Mechanical Division American Railway Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 1177 East Ninety-eighth street, Cleveland, Ohio.

NEWS

THE ATCHISON, TOPEKA & SANTA FE has let a contract to the Roberts & Schaefer Company, Chicago, for the construction of a 200-ton capacity reinforced concrete automatic electric locomotive coaling plant, a gravity sand plant with steam drying facilities, and an electric cinder handling plant at Boise City, Okla.

Salary Reduction for Officers of Pennsylvania

DIRECTORS OF THE PENNSYLVANIA at a meeting on June 24 approved a reduction of 10 per cent in the salaries of all executives and general officers of the company. At the same meeting action was taken reducing the annual dividend rate from 8 per cent to 6 per cent on the common stock of $50 par value.

Stevens Honors Wright

STEVENS INSTITUTE OF TECHNOLOGY at its commencement exercises on June 6 conferred the honorary degree of Doctor of Engineering upon Roy V. Wright, editor of the *Railway Mechanical Engineer* and president of the American Society of Mechanical Engineers. The citation of Mr. Wright's accomplishments reads as follows:

"ROYDON VINCENT WRIGHT.—Mechanical Engineer, whose practical experience in railway engineering has during twenty-seven years expressed itself through his work as an author, publisher and editor, whose sincerity and clarity of thought have given him a place of unusual significance among the interpreters of an age determined by mechanical achievement, who as President of the American Society of Mechanical Engineers now presides over the affairs of a great fraternity of engineers founded within our college walls."

Conference Board Finds "Real" Railway Wages Higher

DURING THE LAST QUARTER of 1930, both average hourly and average weekly real earnings of the railroad employees of the United States were higher than in any other recorded period during the last seventeen years, according to a tabulation of statistics made by the National Industrial Conference Board in its recently published report on "Wages in the United States, 1914-1930." The computations are based on data gathered by the Interstate Commerce Commission and relate to the employees of Class I railroads.

Average actual or money hourly earnings of all wage-earners employed on Class I railroads were slightly higher in 1930 than in 1929. The increase in average hourly earnings since 1923 amounts to 10.2 per cent. This increase does not necessarily denote a higher wage rate but may reflect merely an increase in the employment of more efficient workers or a decline in the employment of less efficient workers.

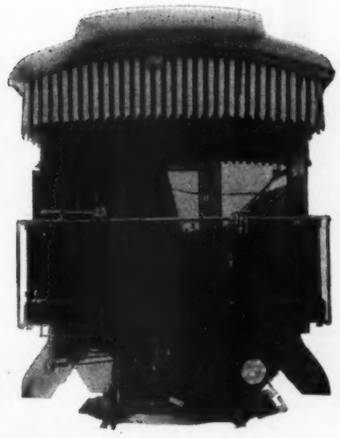
The favorable situation of the railroad wage-earners is shown by a comparison of their real earnings; that is, their actual money earnings expressed in terms of the cost of living, or the purchasing power of the dollar. Taking 1923 as a base, it is found that real weekly earnings in 1930 were 7.9 per cent above the 1923 level, as compared with 6.9 per cent in 1929.

Although the hourly earnings of all classes of railroad wage-earners were higher in 1930 than in 1929, the weekly earnings showed a slight falling off due to the fewer number of hours worked. The highest weekly earnings were those of road passenger engineers, which were $65.13 in 1930 as compared with $66.35 in 1929. Road freight engineers earned a weekly average of $60.51 in 1930 as compared with $64.11 in 1929. Road passenger conductors earned a weekly average of $60.44 in 1930 as compared with $60.96 in 1929. The lowest average weekly earnings were those of unskilled shop labor, which were $17.47 for 1930 as compared with $18.14 for 1929.

Draft Gear Case Argued Before Federal Trade Commission

ORAL ARGUMENTS were heard by the Federal Trade Commission at Washington, D. C., on June 11 in the case in which the commission had issued a complaint against the Waugh Equipment Company and individual officers of Armour & Company and the Armour Car Lines charging unfair methods of competition in the sale of draft gear to railway companies by promising or threatening the increase or diversion of Armour traffic. Argument in the similar case against the Mechanical Manufacturing Company and officers of Swift & Co., set for the following day, was deferred because of the absence of counsel for the Mechanical company in Europe.

The case against the Waugh company was argued for the commission by E. F. Haycraft, who asked the commission to issue a "cease and desist" order, while the argument for the defense was presented by E. M. O'Bryan. Mr. Haycraft said that stock in the Waugh company had been given to the Armour officers, after the company had been unable to make much headway in the sale of its draft gear, but that with the assistance of the solicitation of the Armour traffic officers, through the traffic departments of the railways, its business had increased until in 1930 it was the largest seller in the country of draft gear for new cars.



Mr. O'Bryan, on the other hand, attributed the increase in the company's business to improvements in its draft gear and to the knowledge of the improvement which was disseminated among railway men as the result of the American Railway Association draft gear tests. The principal point he emphasized was that the large increase in the Waugh business did not begin until 1928, after an improved draft gear had been adopted, and said that the company had previously not been able to "break in" on certain roads until there was some change in the mechanical personnel; and he further argued that it was not proper to make comparisons of the business of various draft gear manufacturers on the basis of gears supplied for new cars, because so many more are used for maintenance.

Mr. Haycraft, in rebuttal, said that the report of the draft gear tests was not made until 1929, and that it was still only tentative; also that the detail testimony showed that Mr. Ellis had gone much farther in seeking to use traffic influence than merely to obtain a hearing for representatives of the Waugh company.

Air-Conditioned Diners on P.R.R.

DESIGNED to increase the comfort of passengers by reducing the heat and noise of summer travel, the Pennsylvania has recently placed in service its latest type dining car equipped with an entirely new air-conditioning system. The new type car, which circulates cooled and purified air regulated to any desired temperature, will operate on some of the Pennsylvania's de luxe passenger trains.

Preliminary tests have shown the possibility of maintaining a temperature of 76 deg. F., with an outside temperature of more than 100 deg. Under actual service conditions, the interior of the car can be kept at least 12 deg. below the outside temperature, when desired.

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—one who selects his melting charges taking time to see that the steel is properly refined in the open hearth furnace before being tapped.

We see to it that the steel is poured into correctly designed ingot moulds with a liberal hot top. This draws the piped or segregated area up into that portion of the ingot which is later discarded.

In heating for rolling or pressing we make sure that ample time is taken to make certain the heat has penetrated uniformly throughout the mass.

Drillings are taken from all heats and sent to our laboratory for complete chemical tests before billets are released for shipment.

There can be no compromise with quality in forgings. Today, when locomotives must perform satisfactorily under the most severe conditions, Alco forging equipped locomotives prove their worth as nothing else could.

MOTIVE COMPANY
NEW YORK CITY

Maximum insulation against cold as well as heat is embodied in the air conditioning system. The heating and cooling systems are entirely separate. Acoustic felt has been used to line the interior of the car, materially decreasing train noise and providing insulation.

The air-cooling system in dining cars of this new type consists of an ice chamber under the car, cooling radiators through which ice cold water from the chamber is circulated, and blowers for circulating the cooled air through the radiator coils into the car.

As the cool air is driven by fans into the car through vents located near the ceiling, the warm air is withdrawn through grilled openings skillfully fashioned into the wall design of the car. By a series of ingenious ducts, this air is reconditioned and mixed with fresh air brought in through intakes located on each side of the car. The fresh air is scientifically cleaned and controlled by strainers and dampers as it passes through the intake.

Because of the automatically controlled mixing and cooling of the car's air supply, the outer windows of the dining car are permanently sealed. Passageway doors prevent the entrance of heat through the outer doors and halls as diners enter or leave the car.

In keeping with the cooled condition of the car's atmosphere, decorations in gray tones, with blue trimmings, have been used in the interior design. Metal decorations are in silver, with walnut chairs and carpeting of blue and brown.

Fiftieth Anniversary Pittsburgh Testing Laboratory

THE PITTSBURGH TESTING LABORATORY, Pittsburgh, Pa., is this year celebrating its fiftieth anniversary, in commemoration of which it has published an interesting 32-page booklet illustrating its modern equipped laboratories and many of the problems of industry which have been subject to its inspection, research or test.

The laboratory was established in 1881 by Alfred E. Hunt and George H. Clapp, chemists and metallurgical engineers, under the name of Hunt and Clapp—Pittsburgh Testing Laboratory. This was in the early days of the steel industry and the firm became known as experts on steel, iron and other metallurgical problems, manufacturing processes and finished products incidental thereto. Aluminum was first produced on a commercial scale after research along the lines of the Hall patents by the Pittsburgh Testing Laboratory, both Mr. Hunt and Mr. Clapp being active in the organization of what has now become the Aluminum Company of America.

In addition to chemical and physical tests and investigations, the laboratory performs engineering inspection of all kinds and conducts research and special investigations into processes and industrial methods.

Avis Shops To Be Closed

THE OPERATION of the locomotive shops of the New York Central at Avis, Pa., is to be discontinued at the end of July and most of the machinery will be sent to the shops of the company at West Albany, N. Y. Arrangements will be made to enable employees to follow the work to West Albany so far as their seniority entitles them to positions.

Five Day Week for Southern Shops

SHOP EMPLOYEES of the Southern have recently voted in favor of a plan proposed by the management for placing its shop operations on a five-day week basis, instead of operating for six days a week with fewer men. The vote was necessary because the employees had an agreement with the company on a six-day basis.

Pennsylvania Orders Mechanical Parts for 90 Electric Locomotives

THE PENNSYLVANIA has placed orders at a cost of $4,700,000 for the material and the construction of the mechanical parts or chassis of 90 of the 150 electric locomotives for which the railroad recently purchased the electrical equipment as reported in the June *Railway Mechanical Engineer*. The locomotive parts included in the new order consist of driving wheels, axles, trucks, frames and cabs and the structural parts in which the electrical apparatus will later be installed. The construction and material costs are in addition to the cost of electrical equipment recently ordered.

Of the locomotives included in the new order 54 will be built by the Westinghouse Electric & Manufacturing Company, at Eddystone, Pa.; 25 will be constructed by the General Electric Company, at Erie, and 11 will be built in the Pennsylvania's shops at Altoona.

Locomotive chassis to be built at the Westinghouse locomotive plant will use electric equipment manufactured by that company, and the locomotives to be built by the General Electric Company at Erie, and at the Altoona works of the Pennsylvania, will carry electrical equipment built by the General Electric Company.

Deliveries on this order are scheduled to begin not later than December of this year and the entire consignment of 90 locomotives is expected to be ready by June, 1932.

Optimistic on Tank Car Outlook

THE NEXT FIVE YEARS will see an increase in the number of tank cars in use in the United States over present levels and an increase in net earnings of the leading companies engaged in the operation of tank car equipment over the average net earnings of companies occupying similar leading positions in other industries, according to Ernest L. Nye, of Freeman & Company, a firm active in railroad equipment trust financing.

As a result of an extended trip in mid-continent territory, Mr. Nye expressed the firm conviction that the tank car industry has nothing to fear from the gasoline pipe line as a serious competitor.

"Figures reported by the leading lease line companies for 1930 show that during this year of depression these companies returned net earnings greatly in excess of the average net earnings of leading companies engaged in other lines of business," he said.

"The largest of the proposed gasoline pipe lines, for example, it is understood, will have a capacity equal only to 150 tank cars per day and this, as pointed out, will be more than offset by the additional distribution needed in short hauls. In fact, the total mileage of all the gasoline pipe lines now in operation, and all the proposed gasoline pipe lines, constitutes a total daily capacity of relatively small importance when the daily operation of the 185,000 tank cars of the country is taken into consideration.

Fuel Consumption Reduced

A NEW RECORD in fuel conservation for locomotives was established by the railroads in 1930, according to reports for the year just compiled. An average of 121 lb. of fuel was required in 1930 to haul one thousand tons of freight and equipment, including locomotive and tender, a distance of one mile. This was the lowest average ever attained since the compilation of these reports was begun in 1918, being a reduction of 4 lb. under the best previous record established in 1929.

A new record in the consumption of fuel in passenger service was also established in 1930, an average of 14.7 lb. having been required to haul each passenger train car one mile, compared with 14.9 lb. in 1929.

The railroads in 1930 spent $275,213,781 for fuel for both road and yard switching service, compared with $325,813,895 in 1929. They used 97,857,093 tons of coal for both road and yard switching service. In 1929 the amount was 112,951,929 tons. The railroads also consumed in road and yard switching service in 1930 a total of 2,320,252,497 gallons of fuel oil compared with 2,568,800,341 gallons in 1929.

(Continued on next left-hand page)

Domestic Orders Reported During June, 1931

Locomotives

Name of Company	No. Ordered	Type	Builder
Albany (N. Y.) Port District Commission	2	Gas-Elec.	Mid-West Locomotive Company
Total for Month of June	2		

Freight Cars

Name of Company	No. Ordered	Type	Company
Cleveland Electric Illuminating Company	2	Hopper	Bethlehem Steel Co.
Chicago Great Western	500	Box	Pullman Car & Mfg. Corporation
General American Transportation System (Chicago)	250	Refrig.	General American Car Co.
Northwestern Refrigerator Line Co.	220	Refrig.	American Car & Foundry Company
Total for the Month of June	972		

Supply Trade Notes

F. H. MOREHEAD, chief engineer of the Walworth Company, has been elected engineering vice-president.

THE J. S. COFFIN, JR. COMPANY has moved its office to its new building at 326 South Dean street, Englewood, N. J.

C. G. BACON has resigned as director of wheel research of the Armco Railroad Sales Company, but remains with the company in a consulting capacity in connection with wrought steel wheels.

E. E. GRIEST, general superintendent of the Chicago Railway Equipment Company, has been appointed vice-president in charge of manufacture.

JAMES A. IRELAND, representative of Steel & Tubes, Inc., Cleveland, Ohio, has been appointed central district sales manager.

THE TRUSCON STEEL COMPANY OF CANADA, LTD., has opened an office at 620 Vancouver block, Vancouver, B. C. E. G. Ryley has been appointed manager.

HARRY T. GILBERT, assistant to the president of the Republic Steel Corporation, Youngstown, Ohio, with headquarters at Cleveland, has resigned.

A. C. MOORE, vice-president of the Chicago Railway Equipment Company, was elected executive vice-president at a meeting of the board of directors on June 13.

THE WOOD CONVERSION COMPANY has opened a railroad sales office at 149 California street, San Francisco, Cal., in charge of O. J. Stevens.

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio, has opened an office and showroom at 547 West Washington boulevard, Chicago, under the charge of Martin J. Luther.

W. J. PARKER has been appointed commissioner of the Forging Manufacturers Association, succeeding G. H. Weiler. The new offices of the association are at 7 East Forty-Fourth street, New York.

ADOLPH RIDER, JR., representative of the Lukens Steel Company has been elected president of Lukens & Co., Inc., which has been organized to handle direct mill sales in New Orleans, La.

DAVID GEISSINGER, formerly direct factory representative in Pittsburgh, Pa., for several machine tool manufacturers, is now affiliated with the Fort Pitt Steel Casting Company, McKeesport, Pa., as special representative.

R. H. RIPLEY, president of the General Steel Castings Corporation, Eddystone, Pa., has been elected chairman of the board to succeed Clarence H. Howard, resigned. Harrison Hoblitzelle, vice-president and general manager, at Granite City, Ill., has been elected executive vice-president, with headquarters at Philadelphia, Pa.

LUKENWELD, INC., division of Lukens Steel Company, Coatesville, Pa., has appointed W. R. McDonough & Company as representative in the Cleveland district, and the Dravo Doyle Company as representative in the Pittsburgh territory.

LESTER A. BLACKFORD, assistant treasurer of the American Car & Foundry Company, New York, was elected treasurer at a special meeting of the board of directors, to succeed Stanley Andrew Mallette, deceased.

FRANK BAAKES, JR., a representative of the American Steel & Wire Company, with headquarters at Cincinnati, Ohio, has resigned to become a representative of the Keystone Steel & Wire Co., Peoria, Ill., with headquarters at Chicago.

C. G. CARTER, vice-president and treasurer of the Liquid Carbonic Corporation, Chicago, has been placed in charge of sales, succeeding Carl J. Palmer, who has resigned to become vice-president of the Bastian-Blessing Company, Chicago.

THE PURITAN COMPRESSED GAS CORPORATION, 2112 Grand avenue, Kansas City, Mo., has been appointed distributors in the state of Kansas and the western part of Missouri of the Weldite line of welding rods for the Fusion Welding Corporation, Chicago.

THE RAILWAY EQUIPMENT AND MACHINERY MART has been organized to make it possible for manufacturers to display their products in the St. Louis Mart building now being constructed on the southwest corner of Twelfth boulevard and Spruce street in St. Louis, Mo.

A. F. O'CONNOR, who has been with the Union Railway Equipment Company, Chicago, for the past 16 years, has resigned as vice-president and director of that company to become assistant to vice-president of the Equipment Specialties Company, Chicago.

GARRETT A. CONNORS has been appointed vice-president and director of purchases of the Truscon Steel Company, with headquarters at Youngstown, Ohio. Mr. Connors has been for 24 years in the service as an executive in the production division of the same company.

THE DEVILBISS COMPANY, Toledo, Ohio, has changed the location of its St. Louis, Mo., sales and service branch from 1903 Washington avenue to 1937 Washington avenue, and has also changed its New York sales and service branch from 25 West Forty-third street to 25 West Forty-fifth street.

JOSEPH T. RYERSON & SON, INC., Chicago, who, in 1924, purchased the interest of W. J. Reed and others in the Reed-Smith Company, Milwaukee, Wis., has now purchased the remaining stock, and the firm becomes the Reed-Smith Plant of Joseph T. Ryerson & Son of Wisconsin, Inc.

GEORGE F. NEWELL, representative of the Charles Engelhard Company, with headquarters at Chicago, has resigned to become vice-president and general manager of the Pyrometer Service & Supply Corporation, with headquarters at Cleveland, Ohio.

F. C. PICKARD has retired as works manager of The Standard Stoker Company, Inc., and the following appointments have been made: H. P. Anderson, chief plant engineer; A. C. Secor, shop superintendent and N. J. Shea, chief plant clerk, all with offices at Erie, Pa.

OWEN D. KINSEY, formerly general supervisor of shop machinery and tools of the Chicago, Milwaukee, St. Paul & Pacific, is now with the Whiting Corporation, Harvey, Ill., in charge of plant maintenance, including shop machinery, power-plant and tool-room equipment.

CHARLES G. MELVIN, New York sales agent at 230 Park avenue, New York, of the Griffin Wheel Company, Chicago, has severed his connection with the company and the New York office of the company has been closed. Business will be handled from the Chicago office.

H. A. PAARMAN, secretary and treasurer of the Scientific Production Corporation, New York, has resigned to become vice-president in charge of sales, eastern district, of the Grip Nut Company, with headquarters in the Graybar building, 420 Lexington avenue, New York.

STERLING F. ASHLEY, until recently assistant chief draftsman of the New York Central, has been appointed sales engineer of T. H. Symington & Son, Inc., Baltimore, Md. Mr. Ashley was born on June

Sterling F. Ashley

2, 1897, at Chatham, N. Y. He attended the public schools of Chatham and in 1916 entered the service of the New York Central in its operating department. In 1917 he was transferred to the equipment engineering department as a draftsman and during successive years was promoted to the positions of leading draftsman, designing engineer and assistant chief draftsman. Mr. Ashley's experience has included the design and construction of new equipment and the maintenance of

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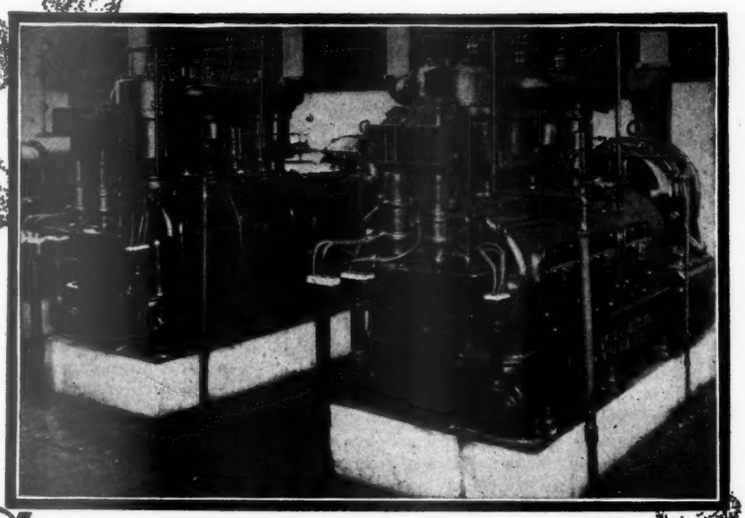

A "baker's dozen" in AIR COMPRESSOR VALUE

JUST as the old time baker threw in an extra bun for good measure, so the builders of Westinghouse-National Air Compressors add extra value to the machines they build . . . . They save valuable space for the user by designing compact machines that are driven direct by the motor or through efficient herring-bone gearing . . . they save installation cost by making complete self-contained machines that need no elaborate foundation nor require extensive auxiliary apparatus . . . they save operating expense by providing complete Automatic Control of distinctive type—which insures that the power consumed will be in proportion to the air compressed . . . they save maintenance expense by building durable machines that will operate for a score of years with minimum time and material for attention and upkeep—thus maintaining the noteworthy tradition of "Quality Machines for Quality Service" . . . Sizes range from 2½ to 700 cu. ft. displacement—for shops, yards, signals, car retarders, etc. . . . .

WESTINGHOUSE AIR BRAKE CO.

General Office and Works **Wilmerding, Pa.**

WESTINGHOUSE—NATIONAL AIR COMPRESSORS

existing equipment, and for the past five years he has also been engaged in research work pertaining to the operation of freight car trucks and truck springs in connection with road tests and investigations conducted by the New York Central test department.

THE AMERICAN BROWN BOVERI ELECTRIC CORPORATION has sold its electrical assets to the Allis-Chalmers Manufacturing Company and has cancelled its electrical connections in Switzerland. The American Brown Boveri Electric Corporation will continue its activities under the name of the New York Shipbuilding Corporation.

THE WILSON ENGINEERING CORPORATION has been organized, with headquarters at 122 South Michigan avenue, Chicago, to manufacture, engineer and market the mechanical equipment and devices heretofore handled by the Bird-Archer Company. The officers of the new company include: President, L. F. Wilson, formerly president of the Bird-Archer Company, and treasurer and mechanical engineer, V. E. McCoy, formerly assistant to the president of Bird-Archer.

THE J. G. BRILL COMPANY, Philadelphia, Pa., has announced the closing on July 1 of its plant at St. Louis, Mo., formerly known as the American Car Company. In closing this plant the Brill management is following the trend toward the elimination of uneconomical operation by concentrating its manufacturing activities for electric railways in the west and middle west, at the plant of The J. G. Brill Company of Ohio, in Cleveland. The J. G. Brill Company's western region will continue sales representation in St. Louis, with R. S. Hood at 1558 So. Vandeventer avenue.

THE AMERICAN LOCOMOTIVE COMPANY and the Railway Steel-Spring Company have opened an office at Washington, D. C., in the Barr building, Seventeenth street, northwest, which will be in charge of Major W. G. Lockwood, general southern representative. These companies' offices in Richmond, Va., have been closed, and Ross Anderson, district sales manager, and B. C. Woody, sales agent will be transferred to Washington. The Washington office, in addition to handling the business of the aforementioned companies, will also look after the interests of McIntosh & Seymour and Alco Products, Inc., both of which are subsidiaries of the American Locomotive Company.

AN ARRANGEMENT has recently been concluded by the United States Steel Corporation with Fried Krupp, A. G., Germany, whereby the subsidiary companies of the Steel Corporation are licensed by Krupp under various patents of Strauss, Johnson, Armstrong, Fry, Kuehn and Smith for rust-resisting and heat-resisting and other alloy steels, and for the heat treatment thereof. This arrangement, which includes the collaboration of Krupp with respect to technical matters in connection with corrosion-resisting and heat-resisting steels, etc., will apply to the products of the Illinois Steel Company, Carnegie Steel Company, American Steel & Wire Company, American Sheet & Tin Plate Company, National Tube Company, and Lorain Steel Company. The major products manufactured by these companies in corrosion-resisting and heat-resisting steels include shapes, plates and bars, strip, wire products, rope, sheets, tubes and castings.

JOSEPH A. CARLIN, formerly receiver, has been appointed general manager, under a reorganization plan of the Hutto Engineering Company, Inc., Detroit, Mich.; Frank J. Jeschke has been appointed sales engineer; Ben O. Isom has returned to the company's service as factory representative for Detroit and Chicago territories; William F. Toepfer has been appointed factory representative for Philadelphia, New York and Boston territories; J. L. Navin has been appointed field engineer for Cleveland, Pittsburgh, Buffalo, Rochester and Syracuse territories and James G. Young is assuming responsibility for sales until June, when he will leave on a foreign tour prior to locating in Europe as the Hutto Engineering Company's oversea representative.

D. A. LUCAS, who has been associated with the Prime Manufacturing Company, Milwaukee, Wis., and the late O. L. Prime for the past 13 years, has been elected vice-president of the company. Mr. Lucas

D. A. Lucas

has had a long experience in the railroad field. Prior to his association with the Prime Manufacturing Company he was for 47 years in railroad work, serving consecutively with the Milwaukee Northern; the Chicago, Milwaukee, St. Paul & Pacific, at Green Bay, Wis., and from 1892 for 25 years with the Chicago, Burlington & Quincy. Mr. Lucas has also taken an interest in civic affairs, having served as mayor of Havelock, Neb., while in the service of the Chicago, Burlington & Quincy.

MANNING, MAXWELL & MOORE, INC., New York, has discontinued the direct sale of Putnam machine tools in the Chicago territory. The Chicago sales branch of Manning, Maxwell & Moore was closed on May 1 and the Dean Machinery Company has been appointed to represent the company in the sale of Putnam machine tools in the machine tools. The new address of the Dean Machinery Company offices is 80 East Jackson boulevard, Chicago, with warehouse at 2601 Cottage Grove avenue. The Chicago office of the Consolidated Ashcroft Hancock Company, Inc., a subsidiary of Manning, Maxwell & Moore, Inc., will continue to operate without change. The manufacture of Shaw overhead electric traveling cranes will be continued at Muskegon, Mich., the direct sales of which in the Chicago territory will be handled at 80 East Jackson boulevard.

E. G. GRACE, president of the Bethlehem Steel Corporation, has announced that an agreement has been made for the acquisition by Bethlehem of the properties and business of Kalman Steel Company, subject to the approval of the stockholders of the latter. Kalman Steel Company is a large fabricator and distributor of reinforcing steel, with warehouses in various cities in the Eastern and Middle Western districts.

Obituary

W. M. RYNERSON, New York representative of the Carter Bloxonend Flooring Company, Kansas City, Mo., died on May 29.

EDWARD SCHEFFEL, sales representative, eastern district, of the American Locomotive Company, died on May 3, at Brooklyn, N. Y.

WILLIAM LAWRENCE SAUNDERS, chairman of the board of directors of the Ingersoll-Rand Company, New York, died on June 25, at Teneriffe, Canary Islands.

WALTER E. COFFIN, mechanical engineer, National Malleable & Steel Castings Company, Cleveland, Ohio, died on June 25.

JOSEPH B. TERBELL, chairman of the board of directors of the American Brake Shoe & Foundry Company and for the past 30 years connected with that company, died on April 15 at his home in New York City, at the age of 68.

ARTHUR LATHAM CHURCH, mechanical engineer, secretary and assistant treasurer of the Baldwin Locomotive Works, Philadelphia, Pa., died of heart disease on June 25 at the Pennsylvania Hospital, Philadelphia, Pa. Mr. Church was born on October 11, 1858, at Philadelphia, and was graduated with the degree of B.S. from the University of Pennsylvania in 1878. His engineering career began in 1878 in the machine shop and drafting room of the William Cramp & Sons Ship and Engine Building Company, Philadelphia. He was later connected with the engine departments of the steamships Queen of the Pacific, City of Peking and Granada and as draftsman of the Union Iron Works, San Francisco, Cal. He went to the Baldwin Locomotive Works in 1886, and at the time of his death was secretary and assistant treasurer. Mr. Church was a member of a number of technical and other associations and was the author of a book on the Training of a Secretary.

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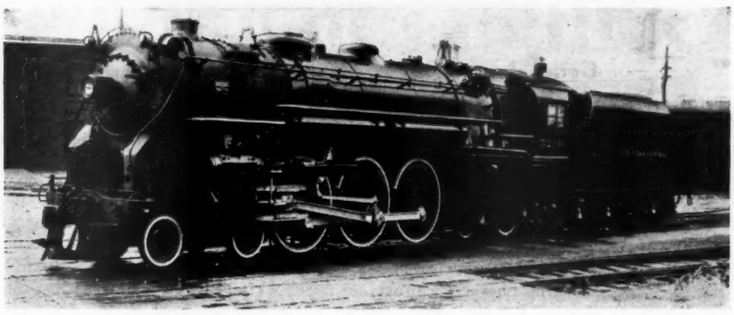
New York Central Hudson (4-6-4) type locomotive equipped with Elesco type "E" superheater with American Multiple Throttle cast integrally with the Nickel Cast Iron Elesco superheater header.



STRONG...

PRESSURE-TIGHT NICKEL CAST IRON

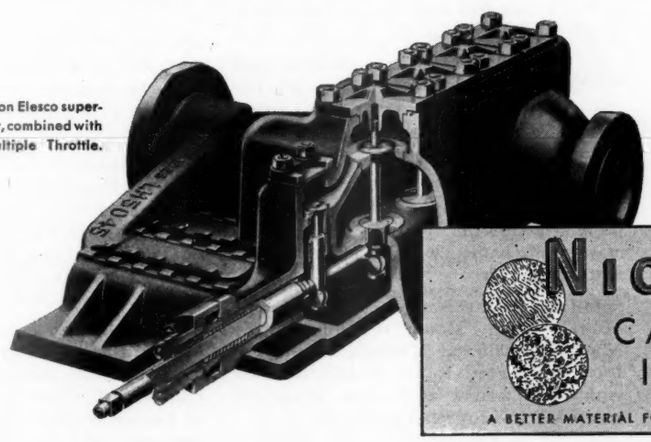
produces improved superheater header castings

While making possible more powerful and efficient locomotives, the use of superheated steam introduces very high temperatures in the superheater headers. These headers, subjected in service to the stresses due to these high steam temperatures and vibration, and with their intricate coring, interior walls and light weight, require the highest grade of material. It must be strong and long-wearing with close-grained qualities to assure absolute tightness under high pressures. At the same time, it must have adequate strength. ● Over a period of 20 years, The Superheater Company has continuously improved the strength and quality of the material for superheater header castings, by adopting scientifically developed iron alloys proved by experience to be good. Several years ago that company adopted Nickel Cast Iron for Elesco locomotive superheater headers. ● Their experience shows that Nickel Cast Iron produces the strength and long-wearing qualities necessary in Elesco superheater header castings to meet the severe service conditions to which these castings are subjected.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Miners, refiners and rollers of Nickel... Sole producers of Monel Metal

Nickel Cast Iron Elesco superheater header, combined with American Multiple Throttle.



Our casting specialists will gladly discuss your problems with you.

INCO NICKEL

Nickel CAST IRON

A BETTER MATERIAL FOR MODERN NEEDS

DISTRIBUTORS

United States

ATLANTA—J. M. Tull Rubber & Supply Co.
BOSTON, Whitehead Metal Products Co. of N. Y., Inc.
BUFFALO, Whitehead Metal Products Co. of N. Y., Inc.
CHICAGO—Steel Sales Corp.
CINCINNATI—Williams and Co., Inc.
CLEVELAND—Williams and Co., Inc.
DENVER—Hendrie & Bolthoff Mfg. & Supply Co.
DETROIT—Steel Sales Corp.
ERIE—Williams and Co., Inc.
KANSAS CITY—Steel Sales Corp.
LOS ANGELES—Pacific Metals Co., Ltd.
MILWAUKEE—Steel Sales Corp.
MINNEAPOLIS—Steel Sales Corp.
NEWARK, Whitehead Metal Products Co. of N. Y., Inc.
NEW ORLEANS—Equitable Equipment Co., Inc.
NEW YORK, Whitehead Metal Products Co. of N. Y., Inc.
PHILADELPHIA, Whitehead Metal Products Co. of N. Y. Inc.
PITTSBURGH—Williams and Co., Inc.
ST. LOUIS—Steel Sales Corp.
SAN FRANCISCO—Pacific Metals Co., Ltd.
SEATTLE—Eagle Brass Foundry Co.
TOLEDO—Williams and Co., Inc.

Canada

MONTREAL—Robert W. Bartram, Ltd.
TORONTO—Peckover's Limited
VANCOUVER, B. C.—Wilkinson Co., Ltd.

Personal Mention

General

THOMAS F. SHERIDAN, chief clerk to the superintendent of motive power of the Pittsburgh & Lake Erie, has been promoted to assistant to the superintendent of motive power, with headquarters as before at McKees Rocks, Pa.

R. R. MCKINNEY, motive power inspector in the office of the superintendent of motive power of the Eastern Pennsylvania division of the Pennsylvania, has been promoted to the position of gang foreman, first trick, at the East Altoona (Pa.) enginehouse.

THE JURISDICTION of W. H. Flynn, general superintendent of motive power and rolling stock on the New York Central, with headquarters at New York, has been extended to include the Harmon shop and forces engaged in maintaining electric and Diesel locomotives and multiple unit cars.

H. W. REINHARDT, who has been promoted to superintendent of motive power and equipment of the Chicago Great Western, with headquarters at Oelwein, Iowa, has been engaged in railway mechanical work for more than 23 years. He ob-

H. W. Reinhardt

tained his first mechanical training on the Chicago, Rock Island & Pacific at Horton, Kan. After completing his apprenticeship on July 5, 1908, Mr. Reinhardt served as a machinist on various railroads, including the Missouri Pacific. From August, 1912, to December, 1923, he was advanced successively on the Missouri Pacific through the positions of gang, enginehouse and general foreman at Falls City, Neb., division foreman at Omaha, Neb., gang foreman at Texarkana, Ark., general foreman at Paragould, Ark., and general enginehouse foreman at North Little Rock, Ark. He was then promoted to master mechanic at Crane, Mo., and was transferred to Poplar Bluff, Mo., in February, 1924; to Monroe, La., in January, 1926, and to Little Rock, Ark., in September, 1926. Mr. Reinhardt was appointed assistant superintendent of motive power and equipment of the Great Western at Oelwein in March, 1931, and his promotion to superintendent of motive power and equipment became effective on May 1.

T. W. MCCARTHY, superintendent of motive power of the First district of the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Iowa, has retired from active duty after 48 years of railway service. Mr. McCarthy was born at Dunkirk, N. Y., on April 27, 1862, and served his mechanical apprenticeship at the Brooks Locomotive Works and the Dunkirk Engineering Works. He entered railroad service in 1883 on the Union Pacific. Later he served with the Wheeling & Lake Erie and the Wabash, being appointed general foreman on the Rock Island at Shawnee, Okla., in 1906. On that road Mr. McCarthy served successively as master mechanic on the Arkansas, Panhandle—Indian Territory, Kansas and Cedar Rapids-Minnesota divisions. He had been superintendent of motive power of the First district at Des Moines since 1926.

Master Mechanics and Road Foremen

ALEXANDER MCPHEE has been appointed master mechanic of the Rocky Mountain division of the Northern Pacific with headquarters at Missoula, Mont.

D. S. LITTLEHALES, master mechanic of the Seattle division of the Northern Pacific, with headquarters at Seattle, Wash., has retired from active service, under the pension rules of the company.

W. H. SAGSTETTER, master mechanic of the Decatur division of the Wabash, has been promoted to assistant superintendent of the locomotive department, with headquarters as before at Decatur, Ill.

H. J. WADE has been appointed road foreman of engines of the Missouri Pacific—Kansas City Terminal and Central Kansas divisions, with headquarters at Kansas City, Mo.

T. D. SAAR, chief locomotive inspector of the Kansas City Southern, has been promoted to the position of division master mechanic, with headquarters at Pittsburg, Kan.

JOHN A. MARSHALL, master mechanic of the Rocky Mount division of the Northern Pacific at Missoula, Mont., has been transferred to the Seattle division with headquarters at Seattle, Wash., to succeed D. S. Littlehales, retired.

THE JURISDICTION OF C. S. BRANCH, master mechanic of the Northern and Southern divisions of the Chicago & Alton, with headquarters at Bloomington, Ill., has been extended to include the Western division.

H. W. BREWER, superintendent of shops on the Buffalo, Rochester & Pittsburgh at Du Bois, Pa., has been appointed general master mechanic in charge of motive power and equipment at Du Bois. The position of superintendent of motive power, which was formerly held by E. V. Williams, deceased, has been abolished.

R. V. CARLETON, division master mechanic of the Canadian Pacific at Ottawa, Ont., has been transferred in the same capacity to the Laurentian division, with headquarters at Montreal, Que.

H. J. MCCRACKEN, master mechanic of the Stockton division of the Southern Pacific at Tracy, Cal., has been appointed assistant master mechanic of the Salt Lake division, with headquarters at Sparks, Nev.

A. C. JOHNSON has been appointed master mechanic of the Pensacola division of the Louisville & Nashville, with headquarters at Pensacola, Fla., succeeding J. E. White, who retired from active service on June 1.

G. W. RAY, master mechanic of the Western division of the Chicago & Alton has been appointed assistant master mechanic of the same division with headquarters as before at Slater, Mo., and the position of master mechanic of that division has been abolished.

J. M. PIERCE, master mechanic of the Kansas City Southern at Pittsburg, Kan., has been appointed to fill the newly created position of general master mechanic at Pittsburg. Mr. Pierce will have jurisdiction over locomotive repairs on their entire line.

C. D. LOVE, assistant master mechanic on the Louisville & Nashville at Covington, Ky., has been promoted to master mechanic of the Nashville terminals of that railroad and the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., succeeding J. L. Enoch, who retired on June 15.

Purchasing and Stores

CHARLES S. WHITE, purchasing agent of the New York Central, has been promoted to the position of general purchasing agent of the New York Central Lines, a newly-created position, with headquarters at New York.

E. J. BECKER, traveling storekeeper of the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to district storekeeper, with headquarters at El Paso, Tex., succeeding L. G. Pearson, deceased. Mr. Becker will also act as division storekeeper of the Rio Grande division.

C. H. MURRIN, special stores accountant of the Illinois Central at Chicago, has been appointed general storekeeper of the Louisville & Nashville, with headquarters at Louisville, Ky., succeeding E. M. Atkins who held the title of acting general storekeeper and who has now assumed his former position as assistant general storekeeper at South Louisville. Mr. Murrin has been engaged in railway stores work for nearly 20 years. He entered railway service in 1904 in the mechanical department of the Chicago, Rock Island & Pacific at Silvis, Ill. A year later he

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